NATURAL RESOURCES - WATER PROGRAM

9.

~~Info Copy~~ WC

SECSTATE MAY 05/060022Z, 1954

USFOTO 355

UNCLASSIFIED MAY 060711Z, 1954

1. Thoma H. Eakin, Interior, Geological Survey, arriving your area Monday May 11 approximately 4:45 AM Airport Jidda, Flight LN 120, to stay until May 15 3 PM to review geological water resources projects.

Eakin visit sponsored by FOA as part of its technical assistance program, and he will coordinate his activities with Glen Brown and USOM.

lsa

DIST:

Ambassador
FOA - Action
Lindquist
File

Action Brown

UNCLASSIFIED

(2)

USA OPERATIONS MISSION TO SAUDI ARABIA
American Embassy - Jidda

April 13, 1954

Mr. Paul F. Taggart
Chief, Iraq-Saudi Arabia-Lebanon-Syria Division
Near East, South Asia and Africa Operations
Foreign Operations Administration
Washington 25, D. C.

Dear Paul:

I refer to your letter dated February 25th relative to the status at that time of the FOA/USGS contract.

Shortly after Glen Brown returned from a rather extended field trip, I discussed with him the possibility of our trying to draft a proposed agreement which might be mutually acceptable to FOA and to USGS. Glen was especially pleased with the idea. Consequently, as soon as we know definitely that we will have a water development agreement with SAG under the Special Economic Aid grant, Glen and I will prepare such proposed agreement and forward it on to you for whatever value it may have there.

As I see the picture at this time, it would seem that two agreements might be required by FOA and USGS: one covering the overall relationship between FOA and USGS, and the other covering a contract with USGS to do that phase of the water development program corresponding to geological work, with Glen Brown, Roy Jackson and the mineral geologists being excluded from such contract. In other words, this contract would cover such personnel and backstopping as could be furnished by USGS in carrying out the above-mentioned phase of the water development program, the same as could be done by any commercial firm engaged in geological work.

I will write you further in this connection at a later date.

Sincerely yours,

Harland J. Corson
Director
USA Operations Mission
to Saudi Arabia

HJCorson:o

USA OPERATIONS MISSION TO SAUDI ARABIA
American Embassy - Jidda

March 10, 1954

Mr. Frank H. Elmore, Jr.
FOA Legal Counsel for the Arab States
USA Operations Mission to Egypt
American Embassy
Cairo, Egypt

Dear Frank:

I am leaving early tomorrow morning on a trip down to the Asir area of Saudi Arabia, but before leaving I want to send you enclosed two copies of a draft of the Water Development Project Agreement under special economic aid so that you can let me have your comments as soon as possible. I am sending this regular airmail rather than through the pouch in order to save time, and would appreciate your returnine one copy, together with your comments thereon, also by regular airmail. I expect to be back in Jidda on March 20th, at which time it is expected that the Ministers will have returned from Riyadh where they are attending a meeting of the Council of Ministers, and we can then start getting our FY-54 TA and Special Economic Aid agreements executed.

I might mention that I have not had time to study over the attached draft, so please feel free to make any suggested changes which you feel should be embodied therein.

The Ambassador just received the package of calcium chloride which you sent him and he said that he would write you a letter of thanks, but wanted me to tell you also how much he appreciates your kindness. He is going to try it out on one of his sand "greens" and I will let you know later how it works since, if it does, I may be sending you an order for a quantity sufficient to take care of six greens of his course, with check attached to cover the cost and shipping charges.

With kindest personal regards to you, I am,

Sincerely yours,

Harland J. Corson, Director
USA Operations Mission to Saudi Arabia

Encl. -
Draft Agreement,
as above

HJCorson:o

2

UNITED STATES OF AMERICA
~~TECHNICAL COOPERATION ADMINISTRATION~~
USA OPERATIONS MISSION TO SAUDI ARABIA
Jidda

OFFICIAL - INFORMAL
UNCLASSIFIED

March 9, 1954

Dear Paul:

Under the authorization given us in your USFOTO 273 dated February 26, we have extended the Baker contract for one month only by means of a letter with acceptance of Michael Baker, Inc. thereon. We attach hereto for your records two copies of such letter.

After Mibaker, Inc.'s accounts have been concluded for the three months period during which they have been under contract with us, we will of course arrange to have an audit made of their books so as to determine the reasonableness and authenticity of all items for which the Community Development funds will be charged. A copy of such audit will be forwarded to you.

As you know, the Minister of Agriculture is attending a meeting of the Council of Ministers which started at Riyadh last Saturday, March 6. It is hoped that this meeting will end somewhere between the 15th and 20th of this month and the Minister of Agriculture will be ready to discuss the details of the Water Development Project under Special Economic Aid. In the meantime, we have sent to Frank Elmore, Legal Counsel for the Arab States, at Cairo, a copy of the draft of agreement which we have prepared to cover this project and have requested him to let us have his comments. We expect to have his reply by the time the Minister returns to Jidda.

If there is evidence that prolonged discussions will be necessary to conclude the Water Development Project Agreement, we will then try to arrange with the Minister of Agriculture for his Ministry to continue the production drilling at Wadis Khulais and Itwad under their part of the Community Development Project with the cost of such work being chargeable to their contribution under such project. As we have pointed out to you, it is to our best interests to have the present nucleus of an exploratory drilling team maintained so that immediately upon the execution of the over-all Water Development Project Agreement, such team can be readily expanded and exploratory drilling can be gotten underway without delays, using aerial maps and mosaics which we now have.

Sincerely yours,

Harland J. Corson
Director
USA Operations Mission to Saudi Arabia

Mr. Paul F. Taggart
Chief, Iraq, Saudi Arabia, Lebanon
Syria Division
Near East, South Asia and Africa Operations
Foreign Operations Administration
Washington 25, D. C.

HJCorson/pa

USA OPERATIONS MISSION TO SAUDI ARABIA
American Embassy - Jidda

March 1, 1954

MIBAKER, INC.
Jidda, Saudi Arabia

Gentlemen:

In the interests of continuing a water development and exploration program in Saudi Arabia until a long-term agreement can be authorized and negotiated, I am pleased to inform you that the USA Operations Mission to Saudi Arabia is interested in extending through the month of March, 1954, the contract existing between us for the months of January and February 1954, without change except as indicated in the following:

1. ARTICLE I, paragraphs 1 and 2, are amended to read, "for the period March 1, 1954 to March 31, 1954."

2. ARTICLE I, paragraph 2, section "C", is modified to read, "Local purchases will not exceed $1,500 (One Thousand Five Hundred Dollars) for the month of March, 1954."

3. ARTICLE I, paragraph 3, section "a", will read, "A fee in the amount of $2,500.00 (Two Thousand Five Hundred Dollars) for the month of March 1954."

4. ARTICLE II, paragraph 1, section "a", is amended to read, "Cost of American Personnel, March 1954, $12,500.00."

5. ARTICLE II, paragraph 1, section "b", is amended to read, "Arab Labor, March 1954, $2,500.00."

6. ARTICLE II, paragraph 1, section "c", is amended to read, "Local Purchases and Miscellaneous Expenses, March 1954, $1,500.00."

7. ARTICLE II, paragraph 2, is modified so that the total amount of expenditure shall not exceed the sum of $16,500 (Sixteen Thousand Five Hundred Dollars), during March 1954.

8. ARTICLE III, paragraph 1, is modified to provide for payment of the fee of $2,500.00 (Two Thousand Five Hundred Dollars) for the month of March 1954, not later than the 31st of March, 1954.

9. ARTICLE VIII, paragraphs 1 and 2, are amended to provide for expiration of the contract on March 31, 1954.

If the above meets with your approval, I should appreciate it if you would indicate your acceptance by signing and returning to me 5 copies of this letter of acceptance.

Sincerely yours,

_______________________, for
MIBAKER, INC.

Harland J. Corson, Director
USA Operations Mission to Saudi Arabia

Water

USA OPERATIONS MISSION TO SAUDI ARABIA
American Embassy - Jidda

OFFICIAL - INFORMAL
UNCLASSIFIED

February 21, 1954

Dear Paul:

By the last pouch I sent you two executed copies of the MiBaker/USAOM contract.

I have not written you sooner or oftener regarding this arrangement due to the fact that the contents of a letter could well be obsolete by the time it reached Washington, since there have been so many discussions and conversations regarding exploratory and production drilling, especially the former, without anything definite being decided.

As you know, the Minister of Finance originally agreed that the drilling equipment of SAG be turned over to Baker here so that, under the direction of Dr. Brown, drilling operations could be continued at Wadis Khulais and Itwad under the Community Development Program, and that the cost of such drilling operation be chargeable to the Community Development Fund. On this basis we cabled you and received authorization from you to use up to $25,000 from such funds to cover the cost of American personnel of Baker still in this country so that we could keep going with drilling operations and retain a skeleton crew (which could be expanded at any time for a full exploratory drilling program) under the direction of Dr. Brown. Such skeleton crew included one driller and we have since obtained one driller on loan from Aramco, the former working at Wadi Itwad and the latter at Wadi Khulais.

As you will have surmised from past communications sent to you on this matter, we are most anxious to retain control of exploratory drilling; in fact, of all exploratory phases of the water development programs, with SAG controlling production drilling, which involves land tenure, water rights, operation of compounds, etc. We have been talking with the Minister of Agriculture along these lines and feel that our ideas have not fallen on deaf ears, even though he has not as yet definitely agreed that exploratory drilling will continue to be under Dr. Brown's direction. He has agreed that production drilling be done under contract with an international drilling company such as Selby Drilling Company of Texas, a

subsidiary

Mr. Paul Taggart,
Chief, Iraq, Saudi Arabia, Lebanon, Syria Division,
Near East, South Asia and Africa Operations,
Foreign Operations Administration,
Washington 25, D. C.

subsidiary of Morrison-Knudsen (Mr. Charles Buck has been actively working on the Minister for a negotiated contract for such drilling). The Minister has been more preoccupied in setting up the Ministry and preparing his budget for the coming meeting of the Council of Ministers (scheduled to begin March 7) than he has in discussing projects.

In a conversation had with him several days ago, he agreed that we should continue with the present skeleton crew for doing exploratory drilling at Wadis Khulais and Itwad, the cost of which would be chargeable to Community Development funds, and requested that we continue to do so until the overall Water Development Project Agreement under Economic Aid has been executed. Furthermore, he wants Dr. Brown to be on his "Water Drilling Committee." So you can see that we are obtaining, apparently, our objectives --

1. retain control of exploratory drilling;

2. that production drilling be under contract with an international drilling company,

instead of having all drilling done by the new Government contractors - a German concern operating under the name of "Govenco" (Government Engineering Company). We pointed out in previous communications and at the Istanbul Conference, our objections to turning over to that company technical data accumulated over four or five years by our Natural Resources Division; also aerial maps, mosaics, etc.

We have estimated the additional funds which would be required for retaining the present exploratory drilling crew through the month of March. Such figure amounts to $12,500. Since the Baker contract expires February 28, we cabled you yesterday (Tousfo 322) requesting your approval to extend the present Baker contract for one month at a cost for retaining such crew not to exceed the above figure, so that exploratory drilling will not be stopped at Wadis Khulais and Itwad and so that the crew in question will not be disbanded. We hope that we will receive such approval very shortly. With your cooperation we feel that we can straighten out satisfactorily the drilling situation here.

I attach hereto draft of a letter which I propose to send to MiBaker, Inc. here amending the present contract to provide for a one-month extension. Of course, several executed copies of such amendment letter would be sent to you for your record.

Sincerely yours,

Harland J. Corson, Director
USA Operations Mission to Saudi Arabia

Encl.
Draft of letter
as above

(Draft amendment to r
resources contract)

USA OPERATIONS MISSION TO SAUDI ARABIA
American Embassy - Jidda

MIBAKER, INC.
Jidda, Saudi Arabia

Gentlemen:

In the interests of continuing a water development and exploration program in Saudi Arabia until a long-term agreement can be authorized and negotiated, I am pleased to inform you that the USA Operations Mission to Saudi Arabia is willing to extend through the month of March, 1954, the contract existing between us for the months of January and February 1954, without change except as indicated in the following:

1. ARTICLE I, paragraphs 1 and 2, are amended to read, "for the period March 1, 1954 to March 31, 1954."

2. ARTICLE I, paragraph 2, section "C", is modified to read, "Local purchases will not exceed $1,500 (One Thousand Five Hundred Dollars) for the month of March, 1954."

3. ARTICLE I, paragraph 3, section "a", will read, "A fee in the amount of $2,500.00 (Two Thousand Five Hundred Dollars) for the month of March 1954."

4. ARTICLE II, paragraph 1, section "a", is amended to read, "Cost of American Personnel, March 1954, $12,500.00."

5. ARTICLE II, paragraph 1, section "b", is amended to read, "Arab Labor, March 1954, $2,500.00."

6. ARTICLE II, paragraph 1, section "c", is amended to read, "Local Purchases and Miscellaneous Expenses, March 1954, $1,500.00."

7. ARTICLE II, paragraph 2, is modified so that the total amount of expenditure shall not exceed the sum of $16,500 (Sixteen Thousand Five Hundred Dollars), during March 1954.

8. ARTICLE III, paragraph 1, is modified to provide for payment of the fee of $2,500.00 (Two Thousand Five Hundred Dollars) for the month of March 1954, not later than the 31st of March, 1954.

9. ARTICLE VIII, paragraphs 1 and 2, are amended to provide for expiration of the contract on March 31, 1954.

If the above meets with your approval, I should appreciate it if you would indicate your acceptance by signing and returning to me ___ copies of this letter of acceptance.

Sincerely yours,

Harland J. Corson, Director
USA Operations Mission to Saudi Arabia

____________________, for
MIBAKER, INC.

Water (

TELEGRAM

Foreign Service of the
United States of America

OUTGOING

PRIORITY

CONFIDENTIAL
Classification

CHARGE:

Control: TOUSFO #322

TO: FOA/W

DATE: Feb. 20, 1954

For Taggart.

MinAgri has now agreed and requested we continue with present skeleton crew for exploratory drilling Khulais and Itwad until overall water development project agreement under economic aid has been signed (meeting Council Ministers scheduled March 7 to consider and approve budgets) with cost such drilling chargeable to community development funds, as was agreed MinFin. After above project agreement signed present drilling unit can then be augmented to handle exploratory drilling program under that project. Indications are that MinAgri will agree direction such exploratory drilling be handled by Brown which is our aim. Additional funds required for retaining present crew through March is $12,500. We urgently request approval extend present Baker contract (expires February 23) one month at cost not to exceed above figure so that drilling will not be stopped or crew disbanded.

CORSON

HJCorson:o HJC

CONFIDENTIAL
Classification

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
USA OPERATIONS MISSION TO SAUDI ARABIA
Jidda

February 18, 1954

Mr. T. E. Eakin
USGS
Department of Interior
Washington, D. C.

Dear Tom:

Thank you for the copies of the proposed ground-water investigations of the Papago Indian Reservation and also the information you sent earlier regarding the Navajo Reservation investigation.

I also have in hand your cable and memorandum regarding the request by the National Resources Council for information concerning the availability of water for fertilizer market in Saudi Arabia. At first, I thought that the question could not possibly be answered, but now, after going over all of the odds and ends of the information we have here or would be available to us through Arabian-American Oil Co., I believe it would be possible for me to estimate (1) the amount of the present and past cultivated land, and (2) the amount of water currently being used for farming activities. This will require several days work, including marking out the terraced lands of the Asir under a stereoscope and projecting that to our mosaics. I hope the National Resources Council will be willing to wait until we can do this work, as it will be the first estimate as far as I know based on aerophotography and miscellaneous facts not heretofore available.

Sincerely yours,

Glen F. Brown, Chief
Natural Resources Division

GFBrown/pa

Info ~~Corson~~

TELEGRAM

Foreign Service of the
United States of America

INCOMING

UNCLASSIFIED
Classification

Control: USFOTO 253
Recd: February 130720Z

FROM: SECSTATE

Date: February 122225Z/1954

For Corson and Brown from Bakin.

USGS National Resources Council requesting information on availability of water for development in Saudi Arabia. Please draft statement potential in qualitative pay for areas studied. Include representative data on number of wells and springs inventoried exploratory and production wells drilled under program, hields of ground and local effect of withdrawal of ground water on water levels. Additional comments follow airmail.

RAND

les

DIST:

Ambassador
FOA - Action
McCullars
File

Action Brown

UNCLASSIFIED
Classification

☆ U. S. GOVERNMENT PRINTING OFFICE: 1953 - 242207

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USA OPERATIONS MISSION TO SAUDI ARABIA
American Embassy - Jidda

February 10, 1954

OFFICIAL - INFORMAL
UNCLASSIFIED

Dear Paul:

I refer to your letter dated January 28 relative to special economic aid programs. As you know, project authorizations under special economic aid comprise the following:

1. Water development
2. Abha-Taif Road
3. Abha Dam
4. Improvement of Port of Gizan

I have informed you in another letter going forward by this same mail that with the aid of Robert H. Smith, Vice President of Aero Service Corp., and Charles E. Buck, Vice President of International Engineering Company, both of whom are presently in Jidda, we have assembled practically all of the basic data, information, cost estimates, etc. for the above-mentioned projects as they are now envisaged. I also informed you in the same letter that as soon as Dr. Glen Brown and Mr. Ed Sinclair return from their present railway survey trip, the first draft of each of the above project agreements will be prepared and presented to the respective Ministers for discussion.

The Water Development Program will involve five major stages; that is - 1) aerial photography, 2) compilation of maps and mosaics, 3) ground geology, 4) exploratory drilling, and 5) productive drilling. Stages 1 and 2 will definitely be carried out under contract. Stage 3 may be carried out either by a group of individually contracted geologists working under the direction of Dr. Brown, or under a contract with USGS (we prefer the latter if a mutually acceptable contract can be negotiated). Stage 4 should be contracted, although the Minister of Agriculture has not definitely decided in this connection. Stage 5 will be contracted as agreed upon by the Minister of Agriculture. (Either the same contractor can be used for Stages 4 and 5 or separate contractors can be used. We prefer the former and hope to be able to convince the Minister accordingly.)

The type

Mr. Paul Taggart,
Chief, Iraq, Saudi Arabia, Lebanon, Syria Division,
Near East, South Asia and Africa Operations,
Foreign Operations Administration,
Washington 25, D. C.

The type of agreement that we will propose to the Minister of Agriculture will be that of Cooperative Service, with one administrator appointed by this Mission handling all exploratory phases of the program; that is, stages 1 through 4, and the other administrator appointed by the Minister of Agriculture handling stage 5, since we do not want to become involved in land tenure, water rights, operation of four drilling compounds, and phases of activity relating to productive drilling.

We cabled you recently inquiring as to the status of the FOA/USGS contract and from your reply we gather that little or no progress has been made in this connection during the past few months. If FOA/W and USGS would like Dr. Brown and myself to try to work out a proposed agreement based on conditions as we see them here, please let me know and we will give it a try. At any rate, we hope that an FOA/USGS contract will be executed soon which will be mutually satisfactory.

At the Istanbul Conference I mentioned to Norman Paul and the others with him that in my opinion the million dollars under project authorization for the Abha-Taif Road could best be used for "road planning and surveys." By this I mean that we would do engineering on roads of greatest interest to the Ministry of Communications, furnish that Ministry with equipment for a road materials testing laboratory, and for covering the cost of a survey for rehabilitation of the Medina-Ma'an Railroad. The Minister of Communications is in accord with these ideas and as soon as we know exactly on what roads he wants engineering work done, we will prepare a revised project authorization and forward same to you to replace the one you now have. All the engineering work above referred to, as well as the railway survey, will be done under contract and the equipment for the road materials testing laboratory will be purchased in the United States. We do not know at this time of what the amount of the host government contributions will consist, nor the purposes for which it will be spent. Negotiations with the Minister on this project will reveal this information.

The construction of the irrigation dam at Abha will be done under contract, towards the cost of which we will contribute up to $250,000. The Minister of Agriculture has indicated that he might want to have another irrigation dam constructed at Akrima (near Taif) and if he decides favorably in this connection, he would like our contribution above cited to be divided between the two works.

The improvement to the Port of Gizan will also be done under contract, with the U.S. contribution of $100,000 being made towards the cost of such work.

Of course, I have discussed a number of times with Ambassador Wadsworth these economic aid projects but a recent development here has led the Ambassador to feel that the time is not now ripe to present an economic aid agreement to the Saudi Government for approval. I wired Norman Paul under date of February 2d (see our TOUSFO 290) to this effect, and transmitted to him the Ambassador's wish that Paul pay him a flying visit from

Beirut

Beirut so that the Ambassador could discuss with him the recent developments and his reasons as to why he feels the Saudis may refuse to sign at this time an economic aid agreement, but instead would prefer to have economic aid projects carried out under the Technical Assistance Agreement.

We have just received FOA/W's reply to TOUSFO 290 (USFOTO 242) stating in substance that it will not be possible for Paul to accept Ambassador Wadsworth's invitation to come to Jidda but will be glad to meet with a USAOM/Embassy representative at Beirut to discuss this matter. To give you some idea as to the nature of the "recent development" on which Ambassador Wadsworth bases his contentions, I might suggest that the status of military aid to Saudi Arabia be discussed with Mr. Fritzlan of the Near Eastern Division of the State Department. In all probability, the Ambassador will want me to meet with Paul in Beirut about the 21st or 22nd of this month to discuss this matter with him. After discussing with Ambassador Wadsworth your USFOTO 242 which just arrived, I will cable you the USAOM/Embassy decision with respect to a meeting with Mr. Paul at Beirut.

As mentioned before, we are going ahead with preparation of a draft of agreement corresponding to each project under economic aid and immediately a decision has been reached as to how such projects should be set up in relation to the Saudi Arabian Government; that is, under what type or form of agreement they should come, we will present such drafts and start negotiations, at the conclusion of which full details will be furnished you so that the contracts covering work to be done under contract as mentioned above may be negotiated. In all probability, projects 2, 3 and 4 listed at the beginning of this letter will be carried out under a simple agreement, rather than a Cooperative Service type of agreement.

I hope that I have given you herein the information which you require regarding the economic aid projects for Saudi Arabia.

Sincerely yours,

Harland J. Corson, Director
USA Operations Mission to Saudi Arabia

HJCorson:o

Info ~~[illegible]~~ Ah

SECSTATE FEBRUARY 2/030147Z/1954

USFOTO 230

CONFIDENTIAL FEBRUARY 3/0836Z

Subject: TOUSFO 280.

For Brown From Eakin 0600.

Consultants Black and Veatch, Burns and McDonald, Metcalf and Eddy, Malcolm Pirnie Engineers, Whitman, Requardt and Associates probably suitable since well qualified municipal water supplies, Royce Tipton or Raymond Hill qualified with experience irrigation development.

FITZGERALD

lms

DIST:

Ambassador
FOA - Action — Brown
McCullars
File

CONFIDENTIAL

Water ①

ELEGRAM Foreign Service of the United States of America

OUTGOING

CONFIDENTIAL
Classification

CHARGE:

Control: TOUSFO #280

DATE: Jan. 27, 1954

TO: FOA/W

For Eakin, USGS, from Brown.

Urgent send names three consulting engineering firms to review Riyadh hydrology and groundwater for feasibility check dam Wadi Hanifa. Should be capable design dam after Dougherty recommendation.

CORSON

Return to File

HJCorson
GFBrown:c Glen Brown

CONFIDENTIAL
Classification

☆ U. S. GOVERNMENT PRINTING OFFICE: 1952 - 220210

Action Copy: (1) [illegible] ①
(2) Files

TELEGRAM RECEIVED

FROM: SECSTATE

DATE: FEBRUARY 032324Z/1954

NO: USFOTO 231

CODE: CONFIDENTIAL

RECEIVED: FEBRUARY 04/0835Z

TOUSFO 283.

Negotiation Agreements still pending awaiting settlement over-all FOA - interior arrangements. Recruiting water chemist and Administrative Assistant. No other airpars* reviewed. Reports and work plans as requested three items page 2 Taggart Letter December 15, 1953, and recommendations as to implementation by contract or direct recruitment required before FOA/W can proceed.

STASSEN

*As recd.

lms

DIST:

Ambassador
FOA - Action
McCullars
File

CONFIDENTIAL

TELEGRAM

Foreign Service of the
United States of Americ

OUTGOING

CONFIDENTIAL
Classification

CHARGE:

Control: TOUSFO #283

TO: FOA/W

DATE: January 30, 1954

For Taggart.

Advise status negotiations FOA/USGS contract. Recruitment personnel required Water Development Project should be gotten underway soonest.

CORSON

HJCorson:o

CONFIDENTIAL
Classification

USA OPERATIONS MISSION TO SAUDI ARABIA
American Embassy - Jidda

January 31, 1954

OFFICIAL - INFORMAL
CONFIDENTIAL

Dear Paul:

This refers to your USFOTO 207 dated January 21 relative to the activities of our Natural Resources Division and an over-all work plan under the economic aid water development program.

We attach hereto memorandum which Dr. Glen F. Brown, Chief of our Natural Resources Division, has prepared in response to your above-cited request.

We might mention that we are now in the throes of preparing the first draft of an over-all water development project agreement for submission to HRH Prince Sultan, Minister of Agriculture. We will keep you posted as to developments in this connection. Of course, both the Minister and we are most anxious to get this program underway as soon as possible.

We shall appreciate having your comments on any points raised in Dr. Brown's reports attached hereto.

Sincerely yours,

Harland J. Corson, Director
USA Operations Mission to Saudi Arabia

Encls. -
As above

Mr. Paul F. Taggart,
Chief, Iraq, Saudi Arabia, Lebanon, Syria Division,
Near East, South Asia and Africa Operations,
Foreign Operations Administration,
Washington 25, D. C.

HJCorson:o

USA OPERATIONS MISSION TO SAUDI ARABIA
American Embassy - Jidda

January 26, 1954

Your Highness:

I take pleasure in attaching hereto a comprehensive report covering accomplishments of this Mission to date in Water Development in Saudi Arabia, in response to Your Highness' letter dated January 13, 1954.

Please feel free to call upon us at any time for any information Your Highness might desire from us.

Please accept my respects.

Sincerely yours,

Harland J. Corson, Director
USA Operations Mission to Saudi Arabia

Attachment -
As above

H.R.H. Prince Sultan Bin Abdul-Aziz
Minister of Agriculture
Kingdom of Saudi Arabia
Jidda

HJCorson:o

(2)

TRANSLATION

Kingdom of Saudi Arabia
Ministry of Agriculture

No. 3

Date 8-5-1373
(Jan. 13, 1954)

Director
U.S.A.O.M.
Jidda

I have reviewed your report of 1-1-54 covering the agricultural work and research which your Mission has accomplished since their arrival to Saudi Arabia.

I wish you would prepare a similar report on water reconnaissance and their results and hope to receive it as soon as possible. The report should be based on the principal and important points.

Please accept my regards.

/s/ Prince Sultan
Minister of Agriculture

7.m.

TRANSLATION

No. 987/521/4

Ministry of Finance
Jidda, Saudi Arabia

Director,
Liaison Office for Technical Assistance

Greetings: We have been informed by the Government Representative to Baker, in his letter No. 3/2/132 dated 10/2/73, that the drilling of two wells has been accomplished in Qunfuda. The water is good for drinking and the average water supply of each well is about 350 gallons per minute.

Please let us know what the experts say about the aforesaid wells. At the same time advise if they recommend constructing a pipe line and a reservoir to be used for drinking purposes and oblige.

Assistant Deputy
Minister of Finance

(Sig) Abdul Aziz

26/2/373 (Nov. 3, 1953)

Sa/A

F.m.

USA OPERATIONS MISSION TO SAUDI ARABIA
Jidda

January 19, 1954

Dear Don:

Herewith is Dr. Tothill's map and summary of his plant zoning.

We are preparing a contract to install gaging stations on Gizan, Baish, Itwad Hali, Yiba, and Hanifa. This will be changed to other wadis, increased or diminished depending on your report, but we are getting some money committed so that a contractor can go ahead. I do not plan a replacement for you, but will try to use someone here as I feel that you have completed the basic work.

FAO have some flood data collected this past summer but so far they haven't given it to me.

I hope Peg is feeling better. The Embassy sent out a check yesterday in the amount of $59.61, which is enclosed.

Cordially,

GFB

Glen F. Brown
Chief, Natural Resources Division

Enclosures -
As above

Copies to:
Mr. H. J. Corson, Director,
USOM to Saudi Arabia, Jidda.

Mr. T. E. Eakin,
Water Resources Division,
U.S. Geological Survey,
Washington, D.C.

Mr. Donald F. Dougherty,
U.S.G.S. P.O. Box 1338,
University Station,
Charlottesville, Virginia

Mr Corson Water

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

U. S. A. Operation Mission
To Saudi Arabia

Jidda, Saudi Arabia

January 13, 1954

Sayed Sami Kutbi
Director General, Departments of Mines and Development Projects,
Ministry of Finance,
Jidda

Dear Sayed Sami:

Greetings,

1. In accordance with our conversations with H.E. the Minister of Finance, Mr. Majors will need 4 rigs and their supporting trucks. Together with the drilling compound in the NE corner of the Baker compound with about 20 x 20 feet of space in the general warehouse where spare drilling parts are now stored. He will supply Covenco with maintenance and parts as he can from Jidda.

2. In addition he will need access to the mess hall, quarters for the men, and house (temporarily an apartment, if no house is available), access to medical clinic and laundry. The contractor will pay rents food costs, medical clinic, and laundry at reasonable current rates.

3. He will need machine-shop access by work order from Covenco in case of special jobs such as carpentry or large machine tooling that cannot be handled in the drilling compound.

Please accept my respects.

Glen F. Brown

Chief, Natural Resources

Water

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

U. S. Operations Mission
Jidda, Saudi Arabia

January 9, 1954

General Manager
Govenco
Jidda

(Through USOM Liaison and Badr Fahoum)

Dear Mr. Starke:

Herewith is a sketch map made by Mr. Goudarzi of Yenbo.

The two wells are near the junction of wadis Nakhli and Fara'a at 51 kilometers from Yenbo el Bahr. Assuming a head of 127 meters from the wells to the sea, and a pipeline diameter of five inches, the line will carry about 168,000 gallons per day to the town by gravity alone. The two wells should be connected to the line and pumped. Weirs should be maintained on the dibbula to ascertain if pumpage effects their discharge. If there is any effect then the plan of withdrawing a fraction of water from nearby eyun as worked out by Mohammed Saleh Kazaz and as currently practised in Wadi Fatima for the Jidda water supply should be followed. The reason for trying the pumped wells first is this: In the drilling, a bed of conglomerate was encountered and an aquifer below the conglomerate was developed. It appears that this aquifer is not the same as that supplying the dibbula and accordingly if water can be obtained for the city without affecting the agricultural water in Yenbo Nakhl so much the better.

As there appears to be inadequate pipe for the entire length, I would suggest that you lay the eastern end of the line first so as to get water as close to Yenbo as possible as quickly as possible. I am told that the condenser has broken down and that the people desperatly need drinking water.

Very truly yours,

Glen F. Brown

Glen F. Brown
USOM - USGS

copy Carson

TELEGRAM

Foreign Service of the United States of America

OUTGOING

CHARGE: CONFIDENTIAL Classification Control: TOUSFO PRITY #256

TO: FOA/W DATE: Jan. 8, 1954

USFOTO 185. MinFin formerly informed Govenco would do drilling but later agreed USAOM do drilling with personnel contracted from Baker and chargeable community development project thereby saving face MinFin. With such personnel completing work started under that project no precedent would be established which would impair later negotiations with SAG concerning economic aid drilling program especially since King has decided water development will be directed by newly created Minister Agriculture as separate entity.

USFOTO 186. Will negotiate contract Baker but personnel remaining includes only one driller. Currently trying borrow three drillers from ARAMCO for three months as one driller insufficient keep control equipment and complete wells for community developments. Need increase $25,000 limitation to $40,000 to be charged community development project. Advise.

CORSON

HJCorson:e

CONFIDENTIAL Classification

Water ②

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
USA OPERATIONS MISSION TO SAUDI ARABIA
Jidda

January 1, 1954

Mibaker, Inc.
Jidda
Saudi Arabia

Gentlemen:

In order that there will be no interruption in the water development and exploration work, which is part of the community development project, we hereby signify our intent to retain your services for the period from January 1, 1954 to February 28, 1954 at a total cost to us not to exceed $25,000.00 (Twenty-five Thousand Dollars).

Sincerely yours,

Thelbert F. Taylor
Executive Officer

To be cleared with:
Glen Brown
John Bode

TFTaylor/djh

Water (2)

CONFIDENTIAL

TELEGRAM RECIEVED

From: SECSTATE

Date: DECEMBER 31, 2211z

No: USFOTO 186

Code: CONFIDENTIAL

Received: JANUARY 1, 1223Z, 1954

Due emergency reported TOUSFO 247 and insufficient date here to contract with Baker USOM/SA authorized negotiate emergency contract not to exceed $25,000 and not to exceed three months for personnel named TOUSFO 247, provided:

1. Every effort fails get SAG to continue Baker Contract.
2. USOM/SA contract will not weaken US future negotiating position with SAG.
3. USOM/SA action does not intervene SAG Baker Govenco negotiations.

STASSEN

lms

DIST:

FOA - Action -
Jones
File

CONFIDENTIAL

TRUECOPY

Water (2)

CONFIDENTIAL

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DIST:

FOA - Action -
Jones
File

CONFIDENTIAL

TRUECOPY

File

File: Special Economic Assist
Near East

Natural Resources

Expanded Water
Development Program.

Glen Brown wrote
2 letters April
Re Budget

Mr. D. took all information
to Riyadh 5/13/53
for meeting with Dulles.
only letter of 4/14 was
returned.
Letter & Summary which were
sent to TCA/W but not
submitted to Fin min = not
returned to file.

File

File: Special Economic Assist
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Water program.

Jidda, Saudi Arabia

July 21, 1953

OFFICIAL - INFORMAL
CONFIDENTIAL

Dear Paul:

I was very glad to have your letter of July 8 and to know of your continued interest in economic aid to Saudi Arabia. I note that the case of S.A. is pretty slim but not hopeless and I will be very glad to give my views in the hope they may be of some use to those of you who are concerned with the allocation of the special grant in aid to the Middle East.

In addition to Embassy despatch No. 387 you have no doubt received Embassy despatch No. 25 of July 11 transmitting an official request of SAG for direct financial aid for certain capital expenditures.

Before outlining my views on the particular projects, it will help toward a proper perspective to discuss briefly the relation of these projects to the whole American effort in this country.

1. TCA Budget and Program.

As you know, our requested budget planned to carry out the purposes and objectives of our several agreements has been cut in half. It is obvious that our efforts will be only partially successful under these conditions. Moreover, due to various causes, all of the new activities, health, education, agriculture and community development have been very slow in getting under way. SAG officials have expressed dissatisfaction at the lack of tangible results and when they discover that our total operating budget is less than half that of any other country in the Middle East and less than one-fifteenth that of some of these countries, their dissatisfaction and resentment will be intensified.

2. Political Problems.

There are some important political problems between the Arab world and the West in which Saudi Arabia is deeply concerned. It seems fairly obvious that there are no satisfactory solutions in sight for any of these.

Mr. Paul F. Taggart,
Chief, Iraq-Jordan-Saudi Arabia Branch, NEADS,
Technical Cooperation Administration,
Washington 25, D. C.

CONFIDENTIAL

Water program.

Jidda, Saudi Arabia

July 21, 1953

OFFICIAL - INFORMAL
CONFIDENTIAL

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Mr. Paul F. Taggart,
Chief, Iraq-Jordan-Saudi Arabia Branch, NEADS,
Technical Cooperation Administration,
Washington 25, D. C.

Now it seems to me that if on top of disappointment in the two fields mentioned above, SAG receives nothing at all from the well advertised grants in aid, there is bound to be a deterioration in relations with the USA. This unhappy state of affairs will prevail regardless of how good the reasons are on which this treatment is based.

As for the three projects for which special aid has been recommended, I am not sure I can add very much to what the Embassy has already said and what we have said in letters, reports and telegrams, but I am very glad to review them briefly.

1. Water Development

Water is the prime limiting factor to agricultural production, not only of the people settled on the land but also of the nomadic people. SAG has long recognised this, and has for years been doing what it could to increase the water supply. Technical assistance in this field was secured from the USGS before Point 4 was established. ARAMCO has also rendered great assistance in this field. The principal weakness of the efforts so far has been in the lack of good judgment in the use of the water and in the inefficient governmental organization handling the drilling, pump installation and operation. Several months ago the high governmental officials led by the Crown Prince proposed a country-wide effort to develop the ground water supply. They asked Dr. Glen Brown, Chief of our Natural Resources Division, to outline a program for this purpose. He did so and his plan with estimated costs and timing schedule are given in the report accompanying the Ambassador's despatch 387. All that SAG expected of TCA at that time was the technical aid which the program would require. However, before releasing Dr. Brown's report, on the advice of the Ambassador I telegraphed TCA/W for authority to undertake the technical work in connection with this program, only to be informed for the first time that our program had been reduced from the requested $2,100,000 to $1,000,000, and that there was no possibility of our participating fully in the expanded program.

The situation now is that with or without TCA cooperation the expanded drilling program will probably be carried out. Without our technical supervision it will be exceedingly wasteful, not only in the cost of drilling and pump installations, but in the utilisation of the water. On the other hand, we have the chance to demonstrate the advantages to be derived from a joint fund operation in which the wells will be located on the basis of geologic data rather than haphazardly, and the drilling and pump installations will be managed at reasonable cost instead of the extravagance, waste and inefficiency which are inherent in SAG's unassisted operations.

I have had a good chance to evaluate the TCA program as a whole -- what it has accomplished and what it may reasonably be expected to accomplish -- and it is my considered opinion that this expanded water program will do more to improve the economy and to raise living standards than all other TCA activities combined. The results will be greater and

more immediate

more immediate compared with cost than anything else we could do. Moreover, the program is one in which the host country believes and in which it is willing to invest its own money.

2. The Abha Dam

Abha was given some consideration as the site of the Community Development Project. I am not sure why El Darb was chosen but I imagine it was because the cost of the proposed dam was too great in relation to the total available funds -- there would be too little money left for agriculture, health, education, etc.

Now in spite of the importance of exploiting the underground water supply, the main reliance of agriculture will be on surface water -- the floods roaring down the wadis after the infrequent rains. In most wadis it is not feasible to build dams for all year-round storage but irrigation depends upon various types of diversion dams. Abha is one of the few places where a storage dam seems feasible from the standpoint of suitable site, comparative absence of silting, available land and population. The dam would be adjacent to the principal town of the Asir, with a population of some 15,000. Mr. Dougherty, our hydraulic engineer, has made the preliminary survey on which the cost estimate was made and Dr. Brown, our chief geologist, has also given his endorsement after exploring the geology. In addition to the technical factors favoring this dam Dr. Brown reports that the Amir and the people generally have expressed their willingness to contribute money and labor in its construction. They point out that there was a dam here in ancient days, that they have not rebuilt it only because it is beyond their financial ability and that they have so far been unable to secure technical and financial assistance from SAG. (See Dougherty's report to the Minister of Finance of July 31, 1952, and the Twitchell-Wathern-Hamilton report of 1943.)

3. The Gizan Harbor

I have nothing much to add to what I said in my letter of June 1. The estimates were made by the FAO and before anything further is done I believe that a more thorough engineering study is in order.

4. Public Roads

In the despatch mentioned above and in a recent communication from the Minister of Finance which has been forwarded with Embassy despatch No. 25 of July 11,1953, mention is made of the importance of road building as a factor in economic improvement. I heartily concur and would place more adequate road facilities next in importance to water development. As you will no doubt recall, we are lending SAG road building machinery for use on the road from Jidda to the Asir. In addition to the machinery the estimate of the engineer who surveyed the road calls for some $350,000 to build a

passable road

Water Program

passable road and three or four times this to build a good hard surfaced road. SAG is undertaking this construction with its own funds and I mention this only to indicate the importance of the road mentioned in the despatch, that is from Gizan-Abha to Taif. Unfortunately we have insufficient engineering data on which to estimate cost but there can be little doubt of the economic importance of this road to the development of the whole Asir region.

If there is any additional information on this subject which would be of help in presenting the case for Saudi Arabia, please let me know and it will be forthcoming to the limit of our ability. While I of course am not empowered to speak for the high officials who recently visited Saudi Arabia, I got the distinct impression that they were sympathetic not only to our TCA problem but more especially to the importance of a more concerted effort in the development of water resources. I have hope therefore that a presentation to Messrs. Dulles, Stassen and Byroade would be well worth while. I hope also you have a chance to confer with Ambassador Hare while he is in Washington.

With personal regards.

Sincerely,

John A. Dunaway
Acting U. S. Director of
Technical Cooperation in
Saudi Arabia

JADunaway:o

Water Program

American Embassy
Jidda, Saudi Arabia

OFFICIAL - INFORMAL
CONFIDENTIAL

July 18, 1953

Dear Paul:

I have your letter of July in partial reply to my letter of June 1 in regard to economic aid to Saudi Arabia. I note your somewhat luke-warm suggestion that I put in my views on the larger question of economic aid and mention in passing the despatch of Ambassador Hare on this subject.

Based on past experience and your plain warning that the die has already been cast, I have no reason to hope that anything I may say will have the slightest influence. If the very able despatch of the Ambassador makes no impression, who will pay any attention to the views of an acting director? However, since the door has been closed but not locked, I will take advantage of the situation to express my views. (See Embassy despatch 387.)

The importance of the grant to Saudi Arabia from the special appropriation for Middle Eastern countries cannot be fully realized except in relation to the regular TCA program. I will not enlarge upon what has happened to our program as planned to carry out the objectives of our several agreements, but refer you to my letter to Si Fryer of May 1. But when SAG finds out as it must in time that our budget has been so reduced that the program will be almost completely ineffective and that on top of this Saudi Arabia is to receive nothing at all from the $194,000,000 grant to Middle East countries, one does not need to be the seventh son of a seventh son to predict their reaction. If Saudi Arabia were to be given what is a fair share of this special grant -- a share based on comparative size, population, need and strategic importance -- the ineffectiveness of the TCA effort might be overlooked. But when Saudi Arabia is discriminated against on both counts it is wishful thinking of the worst sort to suppose that the present friendly relationship can be maintained unimpaired.

With this off my chest, I offer the following views on the three projects mentioned in the Ambassador's despatch:

1. Expanded Water Program

Water is

Mr. Paul F. Taggart,
Chief, Iraq-Jordan-Saudi Arabia Branch,
Near East and African Development Service,
Technical Cooperation Administration,
Washington 25, D. C.

Water is the prime limiting factor to agricultural production, not only of the people settled on the land but also of the nomadic people. SAG has long recognized this, and has for years been doing what it could to increase the water supply. Technical assistance in this field was secured from the USGS before Point 4 was established. ARAMCO has also rendered great assistance in this field. The principal weakness of the efforts so far has been in the lack of good judgment in the use of the water and in the inefficient governmental organization handling the drilling, pump installation and operation. Several months ago the high governmental officials led by the Crown Prince proposed a country wide effort to develop the ground water supply. They asked Dr. Glen Brown, Chief of our Natural Resources Division, to outline a program for this purpose. He did so and his plan with estimated costs and timing schedule are given in the report accompanying the Ambassador's despatch 387. All that SAG expected of TCA at that time was the technical aid which the program would require. However, before releasing Dr. Brown's report, on the advice of the Ambassador I telegraphed TCA/W for authority to undertake the technical work in connection with this program, only to be informed for the first time that our program had been reduced from the requested $2,100,000 to $1,000,000, and that there was no possibility of our participating fully in the expanded program (See Embassy No. 764, April 4, No. 787 of April 13, No. 817 of April 22, No. 845 of May 3, and 898 of June 1. Also, Dept. Nos. 582, 614, 634, 641).

The situation now is that with or without TCA cooperation the expanded drilling program will be carried out. Without our technical supervision it will be exceedingly wasteful, not only in the cost of drilling and pump installations, but in the utilization of the water. On the other hand, we have the chance to demonstrate the advantages to be derived from a joint fund operation in which the wells will be located on the basis of geologic data rather than haphazardly, and the drilling and pump installations will be managed at reasonable cost instead of the extravagance, waste and inefficiency which are inherent in SAG's unassisted operations.

I have had a good chance to evaluate the TCA program as a whole -- what it has accomplished and what it may reasonably be expected to accomplish -- and it is my considered opinion that this expanded water program is more important than all other TCA activities combined. The results will be greater and more immediate compared with cost than anything else we could do. Moreover, the program is one in which the host country believes and in which it is willing to invest its own money.

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I have little to add to what the Ambassador has said as to the merits of Saudi of Saudi Arabia as a recipient of part of the economic aid to the Middle East. It would be a mistake to think that the Saudis are incapable of the same sort of economic suicide stemming from wounded pride and exaggerated nationalism as has afflicted Iran. Where do we find a greater American financial stake abroad than in the ARAMCO investment to say nothing of the importance of the oil itself? If the continuance of a friendly people so near the tremendous oil reserves has any strategic value to the USA and the western world, it is high time some consideration were given to the Saudi needs and desires as compared with those of Lebanon, Jordan and Israel, regardless of the great income from oil and the admittedly inefficient and wasteful government.

With personal regards,

Sincerely yours,

John A. Dunaway
Acting U. S. Director of
Technical Cooperation in
Saudi Arabia

JADunaway/djh

Natural
File 1 Resource
Water Dev.

SecState April 22, 1953.

PRIORITY 817.

RESTRICTED

NOSEC

TOTEC

Urtel 582. If TCA budget Saudi held to one million drastic changes in program and staffing pattern will be necessary. Otherwise programs agriculture, health, education, transportation which are still in planning stage will be ineffective. Suggest serious consideration be given to attitude SAG which from highest to lowest level increasingly bitter at what they consider meager extent of aid in comparison Iran, Egypt, Jordan, Lebanon and especially Israel.

Until this question clarified request freezing recruitment and assignment personnel already selected.

JADunaway/1 HARE

f-1 Natural Resour
~~f-2~~ Expanded Water B
chron
1-Natural Resources
1-Xtra

UNCLASSIFIED

AIR POUCH

, TOTEC. Saudi Arabian Desk

April 15, 1953

AmEmbassy TOTEC Jidda. No. 14

Point 4 - BUDGET: Amended Budget and Expanded Program: Natural Resources Division

There is enclosed an amended budget for the Natural Resources Division, TCA Jidda, which, though calling for no additional funds, in fact actually reduces the total request for that Division for 1954, rearranges the proposed utilization of the total budget by the inclusion of provision for additional technicians, off-set by reduction in estimated requirements of supplies and equipment.

Attachment One is a statement of justification for the proposed amendments to FY 1954 budget signed by Mr. Glen F. Brown, Chief, Natural Resources Division.

There is also enclosed estimates of requirements for carrying out an expanded program for water development in Saudi Arabia. The program is explained in the attached copy of a letter from Mr. Glen F. Brown, Chief, Natural Resources Division, to His Excellency The Deputy Minister of Finance, Kingdom of Saudi Arabia, dated April 13, 1953.

The net effect of these changes is to increase the total budget for the Natural Resources Division and consequently TCA Jidda by an amount of $206,986. We would appreciate further advice as to additional information which may be required to effect this net change in our original FY 1954 estimates.

Enclosures:

1. Statement of justification for
   Proposed Amendments to FY 54 budget
2. Amendment to FY 54 Budget, Natural
   Resources Division
3. Schedule of Estimate, Natural
   Resources Division

Return to Mr. Dunaway

File 1 ✓

Natural Resources.

TECHNICAL COOPERATION ADMINISTRATION
Jidda, Saudi Arabia

MEMORANDUM April 14, 1953

TO: Mr. Sadek Husseini, Director
Liaison Office for Technical Assistance

FROM: Mr. John A. Dunaway, Acting U.S. Director of
Technical Cooperation in Saudi Arabia

RE: Request for Translation of attached Letter to H.E. Deputy Finance Minister

It would be appreciated if you would arrange for the translation of the attached letter dated April 13, 1953, from Glen F. Brown, Chief, Natural Resources Division, TCA-Jidda, to H.E. Deputy Finance Minister, together with the attached summary of estimated costs to the Saudi Government of an expanded water development program. Please have this returned to me when the translation has been completed.

John A. Dunaway
Acting U. S. Director of
Technical Cooperation in
Saudi Arabia

Attachment -
As above

JADunaway:o

File 1 _ Natural Resources

TECHNICAL COOPERATION ADMINISTRATION
American Embassy
Jidda, Saudi Arabia

April 13, 1953

H.E. Deputy Finance Minister
Kingdom of Saudi Arabia
Jidda

Your Excellency:

In accordance with the request of H. E. Finance Minister and our discussions, I submit a plan for an expanded water development program aimed eventually at furnishing stock water to wandering tribesmen and at helping agricultural developments for settlements. In the preparation of these suggestions, I have had the cooperation of the Arabian American Oil Company and of Mr. Dunaway, Acting Country Director for TCA. There has also been some discussion with Mr. Charles Buck of Morrison-Knudson Company, Mr. George Wilson of Michael Baker Company, and members of the Geological Survey in Arabia with me. The recommendations are my own.

The most efficient way to accomplish such a program requires four steps or stages with adequate financing of each stage. These are:

1. Aerial photography as outlined in the letter of Mr. Robert Smith, Vice President of Aero Service Corporation, to you on March 9, 1953.
2. Geologic and hydrologic mapping while obtaining ground control for the aerial photography. The preparation of mosaics by the photogrammetric contractors would follow as rapidly as field parties could determine the astronomical positions.
3. Exploration and test drilling.
4. Development drilling; installation of pumps and motors; and finally maintenance of pumps and engines.

The first step is adequately discussed in Mr. Smith's letter. The price estimate seems fair when compared to existing contracts. And in view of Aero Service Corporation's long experience with operating conditions in Saudi Arabia, they could probably do the job as quickly and as satisfactorily as any company. They are also protected for security of the photography in their Philadelphia plant where the pictures and mosaics should be prepared.

The second step requires active field work by trained geologists and engineers. Unfortunately, adequately trained and experienced geologists and hydrologists specializing in desert water supplies are scarce. It would be necessary to thoroughly canvass the professional fields and perhaps begin with fewer men than the scale your program envisages.

Possibly about ten geologists on aerial mapping, two subsurface geologists, a water chemist, two radio operators, a general manager or contracting officer to see that the drilling operations are carried on in a satisfactory manner, and some administrative assistants would be needed. As the program develops the number and type of specialists would undoubtedly change. The geologists should study all economic possibilities as well as water while making the survey if it is to have maximum benefit. Also, promising young Arabs should be attached to the field parties and assigned to the laboratory work to prepare them for replacing American specialists as rapidly as possible.

The third step, exploration and test drilling, can best be done by starting with the existing organization. Some changes are needed in the present way of handling purchases and finance. Adequate trucks, drills, and men are now into an exploration program which should give us a nucleus for additional work. Control and responsibility for the exploratory drilling should be handled through one office; and an American familiar with drilling equipment, shipping and financial conditions should serve as the protector for the Saudi Government and, to insure the effectiveness of the technical staff of geologists, he should be in the technical office as liaison between the scientists and the drilling contractor. The use of radios would greatly facilitate this work. Some of the exploration drilling could begin in the Riyadh region in order to utilize it for the search for additional water for the capital city.

The fourth step, drilling of development wells, could be handled in the same manner as the exploration drilling but it might also be submitted for bids on a footage basis, utilizing the exploration drilling for precise instructions as to depth, length, and position of screen or slotted pipe and well diameter. The installation of pumps and power as well as the maintenance of the pumping equipment could be handled by fixed fee contractors, installing the type of equipment that eventually local people could learn to maintain themselves.

Any extensive ground-water development in Saudi Arabia should be studied from the viewpoint of Moslem law and control so that water be not wasted nor withdrawn to exhaustion or to salt water encroachment.

Attached is an estimate of cost to your Government. This amount should be set aside and made available at the time that the money would be needed by the contractors. Delays cause excessive increases in cost and these figures are based on the condition that there will be no delay in financial arrangements.

Please accept my respects.

Glen F. Brown
Chief, Natural Resources
Division

Attachment

Summary of estimated costs to the Saudi Government

The estimated cost to the Saudi Government of each step of the program for the first year of effective operation is as follows:

1. **Aerial photography**. Between $1,347,500 and $1,655,500 for the total photography plus aviation gasoline, oxygen for crew while taking aerial photographs, plus quarters and subsistence for about 12 men. Assuming that one-half the job could be completed the first year.

Photography	$ 750,000
Aviation gasoline	75,000
Oxygen	1,000
Quarters and subsistence (four months of flying weather)	16,000
2. **Technical and Scientific Work**. Salaries of technical staff plus travel costs, instruments, etc.	614,400
Housing and field transportation for geologists and engineers. I would anticipate some barrack space for single men and a few houses for married men who would wish to bring their families..	75,000
Field transportation (2 power wagons and one Jeep station wagon per man)	50,000
Mosaic compilation one-half of total area, 45¢ per square kilometer	175,000
3. **Exploration drilling** with the equipment and drillers on hand	750,000
Three churn drills to begin in the Riyadh region to explore for stock water and possible supplemental water for the City of Riyadh	60,000
Drillers and crews for these rigs	50,000
Six Kenworth trucks for the three drilling rigs	120,000
Trailers and camping equipment for the drilling crew	15,000
General manager for watching drilling operations and liaison with U.S. Government technicians and Ministry of Finance	20,000
4. **Development drilling**, pumps and motors, windmills, installation and maintenance	1,000,000
	3,771,400

Natural Resources

RESTRICTED

f-1 f-3 CHRON
~~f-2~~ f-4 III

INCOMING TELEGRAM April 14, 1953

582

TOTEC NOSEC FROM SECSTATE

Your 764. Authorized participate discussion expanded countrywide water development project however believe inadvisable at present discuss US contribution. FYI only TCA budget markings stand at 35 million title II as against proposed 46 million. Figure to be presented Congress not determined possibly less than 35 million. 54 planning figure Saudi Arabia one million with no anticipated reduction.

Embracing water development, utilization and conservation requiring geologist, hydrologist, rangeland management, reclamation engineer and agricultural specialist. Recruitment technicians most difficult security clearance averaging 5 months therefore advise caution promise additional personnel. Personnel basic this program now either in country or under recruitment with exception chemists reclamation engineer.

This project encompasses all elements point four and should not be approached as single effort in natural resources. The finding and development of water will result in settled communities requiing advice on sanitation, education, agriculture and range management.

SMITH

RESTRICTED INCOMING TELEGRAM

76/5

Natural Resources.

SECSTATE

April 13, 1953

PRIORITY 787

CONFIDENTIAL

TOTEC

Brown, Chief Natural Resources Division, TCA, has been summoned Riyadh April 17 to discuss with Finance Minister various pending matters.

Since virtually certain Finance Minister will bring up water development program as reported Embtel 764, April 4, would be helpful if guidance thereon could be received by telegram prior Brown's departure.

HARE

RAHare/wbg

TCA

Natural Resources.

SecState April 4, 1953

764

RESTRICTED

NOSEC

TOTEC

On Feb 17 Ministry of Finance outlined to Brown plan of Crown Prince for expanded countrywide water development and requested advice on procedure and costs. Objectives stock water to reduce Bedouin migration and agricultural irrigation. Requested Brown to consult ARAMCO to correlate with its program, International Engineers on costs. CP also discussed plan with Hare. Brown has prepared recommendations including completion aerial photography, drilling rigs and other equipment bringing the SAG cost to approximately three million dollars yearly. Program requires expansion of technical staff geologists, chemists, engineers. SAG naturally looks to TCA for expanded technical aid. If SAG employed additional technicians would be difficult to coordinate with present TCA geologic effort. Brown estimates that with present staff as nucleus he could handle technical side by additional expenditure next fiscal year $350,000. Hare endorses TCA participation but advises not to mention possibility of additional expenditure to SAG except on Washington clearance. Dunaway concurs and urgently requests consultation Johnston USGS and for authority to discuss project agreement with SAG on this basis. Water is key element in economic development. SAG intensely interested and seems willing spend five times as much as technical aid cost. Program fits general purposes of TCA and no other activity calculated to produce such large and immediate benefits. Participation would foster better relations with USA and reduce growing impatience with slowness and lack of tangible results of other efforts. Urge soonest favorable consideration even if it involves reduction other programs.

HARE

JADunaway:c

File
Nat Res.
Water Dev. Program.

CONFIDENTIAL
Official - Informal

American Embassy,
Jidda, Saudi Arabia,
April 3, 1953.

Dear David:

Once again I wish to invite your attention to several developments concerning TCA.

The first item has to do with a plan for drilling wells on an extensive basis which is a project in which the Crown Prince is particularly interested and concerning which Glen Brown, Chief of the Natural Resources Division of TCA here was asked to work up a preliminary plan. He has been working on this assiduously and yesterday he produced a draft letter to the Ministry of Finance on this subject which Mr. Dunaway, Acting Head of TCA, brought in to discuss with me.

First of all I should like to say that both Dunaway and I approve this project in principle and would hope that TCA could cooperate in it. Our reasons for so feeling are (1) that it is a type of project which falls within the Point IV concept, (2) that it is a matter in which the Saudis themselves are most interested and, as a consequence, our participation should be productive of that good will which is one of the purposes of TCA activity, and (3) that the Saudis seem prepared to invest heavily in the project themselves. The only catch in the matter as presented by Brown is that he had worked up a program which would assume TCA participation. Although Brown indicated in his letter that no commitment could be made in this regard in advance, it seemed to both Dunaway and me that it would be inadvisable to open up

A. David Fritzlan, Esquire,
Office of Near Eastern Affairs,
Department of State,
Washington 25, D.C.

the question of TCA participation until we get a green light from Washington authorizing us at least to go into the matter in a preliminary way. Otherwise we could be placed in the invidious position of having one of our people present a very alluring proposal to the Saudis only to find later that it might be turned down in Washington. Consequently, I took the position that you should have an opportunity to scrutinize this matter prior to our suggesting possible TCA participation to the Saudis. I repeat that I am 100% for this project; in fact it is one of the best that I have yet seen presented, but I think it important that we not get off on the wrong foot. Incidentally, the plan as presented by Brown calls for an expenditure of about $3,000,000 by the Saudis and $350,00 by ourselves.

The second item has to do with a sudden outburst of spleen on the part of the Saudis in connection with our health program here and this was the subject of a telegram to the Department yesterday to the effect that they were threatening to wash out the whole health program but that we were endeavoring to get them to reconsider. Actually I rather suspect that this difficulty has arisen from internal politics in the Ministry of Health centering around certain Egyptian advisors but, on the other hand, I do feel we have been a little bit stiff-backed in connection with certain of their ideas and I hope that the action suggested by Dunaway in his telegram will be taken.

Sincerely,

Raymond A. Hare

cc: TCA, Jidda.

TECHNICAL COOPERATION ADMINISTRATION
Jidda, Saudi Arabia

March 31, 1953

H. E. Deputy Finance Minister
Kingdom of Saudi Arabia
Jidda

Your Excellency:

In accordance with the request of H. E. Finance Minister and our discussions, I submit a plan for an expanded water development program aimed eventually at furnishing stock water to wandering tribesmen and at helping agricultural developments for settlements. In the preparation of these suggestions, I have had the cooperation of the Arabian American Oil Company and of Mr. Dunaway, Acting Country Director for TCA. There has also been some discussion with Mr. Charles Buck of Morrison-Knudsen Company, Mr. George Wilson of Michael Baker Company, and members of the Geological Survey in Arabia with me. The recommendations are my own.

The most efficient way to accomplish such a program requires four steps or stages with adequate financing of each stage. These are:

1. Aerial photography as outlined in the letter of Mr. Robert Smith, Vice President of Aero Service Corporation, to you on March 9, 1953.
2. Geologic and hydrologic mapping while obtaining ground control for the aerial photography. The preparation of mosaics by the photogrametric contractors would follow as rapidly as the field parties could determine the astronomical positions.
3. Exploration and test drilling.
4. Development drilling; installation of pumps and motors; and finally maintenance of pumps and engines.

The first step is adequately discussed in Mr. Smith's letter. The price estimate seems fair when compared to existing contracts. And in view of Aero Service Corporation's long experience with operating conditions in Saudi Arabia, they could probably do the job as quickly and as satisfactorily as any company. They are also protected for security of the photography in their Philadelphia plant where the pictures and mosaics should be prepared.

The second step could be handled by an operating agreement with the United States Government provided it is willing to assist. If this program is approved by your Government then we will present a formal request to the United States Government. Of course we have no assurance what Washington's reaction will be. I should anticipate in the early work eight additional geologists on aerial mapping, two subsurface geologists, a water chemist, two radio operators, a general manager or contracting officer to see that the drilling operations are carried on in a satisfactory manner, and an administrative assistant in addition to the staff we now have. Young Arabs could be attached to the field parties and assigned to the laboratory work to prepare them for replacing American specialists as soon as possible. The difficulties of obtaining qualified personnel are very great and possibly only a part of the necessary specialists could be on the job during the next winter months. Concurrently with this step the photogrametric contractors should begin compilation of mosaics. This work should be added to the program as outlined in Mr. Smith's letter.

The third step, exploration and test drilling, can best be done by starting with the existing organization. Some changes are needed in the present way of handling purchases and finances. Adequate trucks, drills, and men are now into an exploration program which should give us a nucleus for additional work. Control and responsibility for the exploratory drilling should be handled through one office; and an American familiar with drilling equipment, shipping and financial conditions should serve as the protector for the Saudi Government and, to insure the effectiveness of the technical staff of geologists, he should be in the technical office as liaison between the scientists and the drilling contractor. The use of radios, now coming on loan from the United States Navy, will greatly facilitate this work. Some of the exploration drilling could begin in the Riyadh region in order to utilize it for the search for additional water for the capital city.

The fourth step, drilling of development wells, could be handled in the same manner as the exploration drilling but it might also be submitted for bids on a footage basis, utilizing the exploration drilling for precise instructions as to depth, length, and position of screen or slotted pipe and well diameter. The installation of pumps and power as well as the maintenance of the pumping equipment could be handled by fixed fee contractors, installing the type of equipment that eventually local people could learn to maintain themselves.

Any extensive ground-water development in Saudi Arabia should be studied from the viewpoint of Moslem law and control so that water be not wasted nor withdrawn to exhaustion or to salt water encroachment. I should propose that someone familiar with legal control of ground water come from the United States for a period of six months to work with someone in the Saudi Government familiar with Moslem law to plan adequate safeguards for the limited water supplies.

Attached is an estimate of cost to your Government. This amount should be set aside and made available at the time that the money would be needed by the contractors. Delays cause excessive increases in cost and these figures are based on the condition that there will be no delay in financial arrangements.

If the government of the United States is willing to assist in this program we estimate that the additional cost to the American Government will be $350,000 per year.

Please accept my respects.

Glen F. Brown

Glen F. Brown

Summary of estimated costs to the Saudi Government

The estimated cost to the Saudi Government of each step of the program for the first year of effective operation is as follows:

1. Aerial photography. Between $1,347,500 and $1,655,500 for the total job plus aviation gasoline, oxygen for crew while taking aerial photographs plus quarters and subsistence for about 12 men. Assuming that one-half the job could be completed the first year.

photography	$ 750,000
aviation gasoline	75,000
oxygen	1,000
quarters and subsistence (four months of flying weather)	16,000

2.	Housing and field transportation for United States Government geologists and engineers. I would anticipate some barrack space for single men and a few houses for married men who would wish to bring their families.	75,000
	field transportation (2 power wagons and one Jeep station wagon per man)	50,000
	Mosaic compilation one-half of total area, 45¢ per square kilometers	175,000
3.	Exploration drilling with the equipment and drillers on hand.	750,000
	General manager for watching drilling operations and liaison with U.S. Government technicians and Ministry of Finance.	20,000
4.	Development drilling, pumps and motors, windmills, installation and maintenance.	1,000,000
		$2,912,000

T C A Natural Resources.

March 31, 1953

His Excellency, The Deputy Finance Minister
Kingdom of Saudi Arabia
Jidda

Your Excellency:

In reply to your request for suggestions as to how the water resources program can be made more efficient. This can be done by carrying out the recommendations made in my report of May 1952, which the Finance Minister approved. Now, in addition, it is apparent that the responsibility and authority should be handled through one office. Accordingly, it would be desirable to make Sadek bey Husseini Government Representative for the Baker Water Resources Department so that he has authority to make local purchases, to sign time and payroll sheets, to determine drillers' salaries, to supply medical attention, and to make other disbursements. A budget for the operation should be set up and money for the program should be given to him and an accountant in Baker assigned to him. The Water Resources now have an office and garage in the Compound and Mr. Lannan assures me that the Water Resources Program can be handled independently of other Baker activities. A warehouse and office man is available to be assigned to the Water Resources if you approve. Supplies and equipment may be checked in through the general warehouse and then assigned to the Water Resources warehouse. The Water Resources should stock its own parts, which are on order. A mechanic and a welder are assigned and they must each hire a crew of Saudi Arabs to maintain the trucks and rigs. In the event that heavy duty machining is needed it should be routed into the work schedule of the general machine shop with the approval of the Baker manager.

Please accept my respects.

Glen F. Brown
Glen F. Brown
U. S. G. S. - T. C. A.

Natural Resources

II. PROGRAM (Continued)

Natural Resources

Expanded Drilling Program: Some days ago, Glen Brown reported an interview with the Deputy Minister of Finance in which SAG plans were disclosed for a greatly expanded well drilling campaign, accompanied by a complete aerial survey of the whole country. The objectives as outlined were to bring in wells for the livestock of the nomads, particularly along the frontiers in order to reduce their wanderings into other countries and to find water for agricultural purposes. This program would run into millions of dollars. I have asked Dr. Brown for a complete report on this conversation so that you may know what it would entail so far as TCA is concerned.

File: Natural Resources

CONFIDENTIAL SECURITY INFORMATION

File
5

Memorandum of a meeting with Sulaiman Hamad, Deputy Assistant Finance Minister

On February 17, 1953, I was called to the office of the deputy finance minister, Sheikh Sulaiman Hamad, to discuss a plan given to His Excellency the Finance Minister by His Royal Highness Prince Saud, regarding an expanded water development program throughout Saudi Arabia in order to begin settlement of the Bedu on a large scale. The scheme was outlined to me by Sheikh Sulaiman Hamad, reading from a letter from the Finance Minister. They envisage 20 additional drilling rigs to be ordered with a suitable supply of casing and deep well pumps. It was suggested in the letter that the country be studied in quadrants and rigs assigned to each but that the scale and disposition of the drilling should be done on mapping and geological work by the Geological Survey. As a first step they proposed that Aero-Service fly the remaining unphotographed portion of western Saudi Arabia now while in Jidda, the film remaining in the possession of the Saudi Government if they can make adequate moisture-proof vaults (I suggested they be left in bond with U. S. Geological Survey or Aero-Service). There remains something between 250,000 and 300,000 square miles. Their wish is that I prepare a program, including a plan for contracting the drilling and that I should get all the information wherever necessary, including Aramco, Iraq, Iran, India.

While discussiong the scheme with them I expressed myself that considerable thought was required including such problems as an expansion of our present personnel, the submission of the work to other companies(they suggested Army Air Force and Aramco as second and third choices, but I pointed out that it was better to handle it commercially and that Aramco would probably hire Aero-Service if asked to do the job).

I asked their desire for contractors and suggested that in view of the Baker president's visit currently with the Finance Minister that they discuss it. This suggestion did not meet their approval.

CONFIDENTIAL SECURITY INFORMATION

FILE: Natural Resources

CONFIDENTIAL SECURITY INFORMATION

Report of a meeting with Mohammed Surur

On February 24 I was called to the residence of Mohammed Surur, Advisor to the Ministry of Finance, with Sadek by Houseini, TCA laison officer, to discuss the municipal water supply of Gizan.

After exchanging amenities, we discussed the movement of a drilling rig to Musaijid in accordance with Sheikh Sulaiman Hamadh's request in an attempt to find a drinking water supply for the coming pilgrimage. Musaijid is some 80 kilometers southwest of Medina on the Medina-Jidda road. After a discussion of the geologic and hydrologic factors involved H. E. offered to dispatch a truck from Jidda with the necessary casing in order to complete drilling as soon as possible. H. E., Mohammed Surur, is Director of the Pilgrimage Authority.

We then discussed the Gizan water supply. H. E. reviewed the history of the currect development, saying that an agreement had been reached whereby SAG would furnish half the capital outlay, and a local water company the other half. Now the water main has been shipped to Gizan and Juffali Brothers were ready to install it as soon as we could give them the location of the source.

I showed His Excellency the mosaics of the Tihama al Yemen in the vicinity of the town and described the geology as we understood it. I explained the current status of the drilling program, that a rig was now drilling at the most satisfactory site, the driller having instructions to develop the shallow water and that the rotary rig now testing the Darb area would then make a dee½er test at the same site, hoping that we could develop 2 aquifers from one pumping station.

The proper installation now awaits early completion of the test holes.

I then expressed my wish that the Saudi Arabian Government would give early consideration to building a road to Gizan and that it would be extended to Abha and back to Taif along the crest of the Asir. His Excellency replied that in his opinion such development would hinge somewhat on the amount of successful agricultural work accomplished in the Tihama al Yemen.

CONFIDENTIAL SECURITY INFORMATION

Water

USA OPERATIONS MISSION TO SAUDI ARABIA
Jidda

December 31, 1953

OFFICIAL - INFORMAL
CONFIDENTIAL

Dear Paul:

I appreciate the information you gave me in your letter dated December 16 regarding the FOA/USGS relationship, as well as that of FOA and the other technical agencies.

I would like to point out that ever since Glen Brown returned here, he has been most cooperative and his relationship with this office so far has left nothing to be desired. Furthermore, he has given me no indication, either by word or action, that he is out here to "wind up" U.S.G.S. work in Saudi Arabia. It seems to me that whether or not he remains here depends on what kind of an agreement is finally entered into between FOA and USGS, and if the final agreement provides for USGS personnel being on the FOA rolls, what roll he would play in the water development and mineral development programs in Saudi Arabia. If he would continue to be as cooperative in the future as he has been since his return here, I would like to have him as Chief of Natural Resources to advise me, as well as the Saudi Arabian Government, on the development of natural resources in projects coordinated with agricultural and other related programs, and to act as a general supervisor in the carrying out of such projects which, as you know, will be very important ones. I feel that Glen Brown is well qualified to act in such capacities. Of course, it may be that USGS will refuse to let him stay here unless they get the kind of contract from FOA that they want. I hope these questions can be settled soon so that we can get started on our water development program under the '54 grant aid.

As soon as Brown returns from Riyadh, where he is checking the water table as well as paying his respects to King Emir Saud, I will ask him to prepare a comprehensive report embodying work accomplished to date in Saudi Arabia by the Natural Resources Division, a detailed plan of work for our Natural Resources Division covering the remainder

Mr. Paul F. Taggart
Chief, Iraq, Saudi Arabia, Lebanon, Syria Division
Near East, South Asia and Africa Operations
Foreign Operations Administration
Washington 25, D. C.

of the FY-54 period, and an overall plan of work covering the water development program under Economic Aid, this latter plan of work to cover the respective phases mentioned in my cable to you from Istanbul. As soon as such reports are ready, I will forward them on to you without delay and will await your comment on this score before preparing the water development project for presentation to SAG.

Brown has not made any mention to me since his return here about additional personnel. This may be due to the fact that he does have in mind "winding up" USGS work here, but I am more inclined to believe that other problems such as water drilling have occupied his mind to the extent that he has not given much thought to the matter of additional personnel. Upon Brown's return from Riyadh I will discuss with him the matter of personnel for his division, and from that conversation I am sure I will be able to ascertain or at least detect whether or not he has returned for the purpose of winding up his work here. I will inform you on this point a little later.

We have sent you several cables in the last few days covering what we feel here might be a solution, if only in part, to the water drilling problem with which we are faced. Waiting for Govenco to recruit drillers and other qualified personnel to carry on without interruption drilling operations here would be disastrous since we have every reason to believe, based on information gathered from several reliable sources, that it would be some months before Govenco could be drilling to the extent that Baker was a couple of weeks ago. During such time the drilling rigs left on the desert would deteriorate greatly, thereby necessitating extensive repairs with resultant further delays in drilling. We hope that by the time you receive this letter arrangements have been made with Baker/Rochester whereby they will carry on drilling operations to the extent of five rigs under the Community Development Program so that water development at both Wadi Khulais and Wadi Itwad under that project will not be held up. Furthermore, we feel very strongly that by such a nucleus of drilling activities being retained by us through Baker until such time as the water development program agreement under Economic Aid has been signed, it might be possible to convince the Saudi Arabian Government to allow us to continue with such nucleus for doing the exploratory phase of drilling operations, with Govenco doing the productive phase. So far we have not been able to ascertain just why the Minister of Finance day before yesterday instructed Baker/Jidda not to turn over any drilling equipment to Govenco until further notice. It may be that he has decided not to have Govenco do water drilling work or it may be that Govenco will do only part of it, or it may be that all of such equipment, as well as the maintenance shops, will be turned over to the recently created Ministry of Agriculture. We hope to know the answers to these questions shortly and will inform you accordingly. At any rate, our continuing through Baker with five rigs and the operation of the maintenance shop in Jidda for a few months will greatly enhance the goals we are seeking in the water drilling phase of the water development project.

Charles Buck, representing International Engineering Company, has been here for several days and copies of the railway survey report have arrived. These will be presented shortly to the appropriate Government offices. According to the last information which this office has received, it appears that neither King Emir Saud nor the Minister of Transportation and Communications, is interested in going ahead with the construction of the Riyadh-Medina-Jidda Railroad, at least at this time. I am writing you by this same mail regarding the King's interest in reopening the Medina-Jordan Railroad. In fact, we are informed that he has committed himself to do this. Such being the case, there would be obviously still less interest in building a railroad from Riyadh to Jidda via Medina.

Sincerely yours,

Harland J. Corson
Director
USA Operations Mission to Saudi Arabia

HJCorson:o

Water

UNCLASSIFIED

PRIORITY

TOUSFO #247

TO: FOA/W

Dec. 30, 1953

Re TOUSFO 236 Dec. 24, unless immediate arrangements made with Baker/Rochester to hold here drilling superintendent, two mechanics, warehouseman and driller, they will finish their assignment tomorrow. Suggest such arrangements be made through letter of intent or other instrument. Baker/Jidda just received letter from MinFin ordering drilling equipment and shop not be turned over to Govenco until further notice.

CORSON

HJCorson:o

UNCLASSIFIED

Water

UNCLASSIFIED

FOA/Washington December 17, 1953

AMCONGENL, Istanbul FOA

FOR TAGGERT FROM CORSON

Based on discussions held here request as basis Water Development Program immediate preparation in Washington by Glen Brown of report on findings from geological investigation to date and recomended program covering ground water exploration and development.

Program to include description of (a) areas to be investigated, (b) anticipated water resources available by areas in terms of depth of supply, nature of supply, quantity and quality, (c) method of operation of exploratory drilling program, (d) production well program indicating general area of development, cost estimates and statement regarding related agricultural use water, (e) maps delineating areas of proposed work, (f) schedule of aerial photography relative to ground work (g) statement of availability of personnel.

Request report and recommended program be approved by Director USGS. Upon receipt report in FOA/SA and review of production well program by field Agriculture Division, FOA/SA will decide on contractual relationship with USGS and with possible private contractors.

TFTaylor:fdl MACATEE

TELEGRAM

Foreign Service of the
United States of Americ

OUTGOING

CHARGE: RESTRICTED
Classification
Control: 261

SECSTATE

DATE: Dec. 3, 1953

Joint Embassy - USAOM Message. Pass FOA/W

Assistant Deputy Minister for Finance, Abdul Aziz Sulaiman, informed USAOM liaison officer that Abdullah Sulaiman, Minister Finance and Economy, has decided future water drilling will be carried out by Govenco (Government Engineering Co., components Hansa Stahl Export Co. Julius Berger, A.G., both of Dusseldorff). Govenco expected replace Baker upon termination latter's contract SAG December 31. We are informed American drillers now employed Baker refuse work for Govenco or SAG.

If Minister Finance persists his plan utilize Govenco drillers, we fear there will be long interruption drilling activities during changeover period due difficulties recruiting qualified drillers for work Saudi Arabia. Such interruption drilling activities would not only endanger success present drilling program but also adversely affect full utilization special economic aid funds earmarked for water development. Drilling equipment left in field during changeover would deteriorate rapidly, thus resulting further delay. Also doubt advisability making available to other than American contractors technical data, aerial maps and mosaics prepared by USAOM technicians.

USAOM has strongly emphasized Abdul Aziz vital importance uninterrupted drilling program, who in turn discussed question with Minister. Both Embassy and USAOM will continue efforts impress importance this question upon SAG. ¶ In order permit USAOM participation selection drilling contractors and strengthen its ability minimize drilling interruption, request:

(1) Transmission Embassy final draft notes setting up 1954 technical assistance and economic aid programs (USFOTO 143, November 20);

(2) Instructions be given Embassy proceed immediately thereafter exchange notes establish cooperative service type agreement as prescribed TCA Manual dated September 1, 1953.

JONES

HH

HJCorson/JJJones/wbg

Majors - [illegible]

RESTRICTED
Classification

☆ U. S. GOVERNMENT PRINTING OFFICE: 1952 - 220210

TELEGRAM Foreign Service of the United States of America

OUTGOING

CHARGE: RESTRICTED
Classification
Control: TOUSFO 218

DATE: November 29, 1953

GLEN F. BROWN
FOREIGN BRANCH
U.S.GEOLOGICAL SURVEY
WASHINGTON, D. C.

From Corson and Jackson.

EFFORT MADE TO HAVE SAG CONTINUE DRILLING UNDER PRESENT MANAGEMENT BEYOND DECEMBER 31 WITH SEPARATE WATER RESOURCES DEVELOPMENT CONTRACT. FINAL SAG ANSWER DUE TUESDAY BUT ROCHESTER DECISION TO SHUT DOWN DECEMBER 1 COMPLICATES ISSUE. SUGGEST YOU KEEP CLOSE CONTACT ROCHESTER. DRILLING CREWS LOSING PATIENCE AND REFUSE SAG OR GERMAN CONTRACTS. COMPLIANCE WITH DECEMBER 1 deadline means crews to be returned jidda and out of COUNTRY IMMEDIATELY. SAG PROCRASTINATION PROBABLY DUE TO THEIR DESIRE TO HANDLE DRILLING PROGRAM AS GOVERNMENT AGENCY UNDER DEPARTMENT AGRICULTURE BUT SAG UNREALISTIC ABOUT NECESSITY FOR STATESIDE CONNECTIONS AND DEPOSIT ACCOUNT IN STATES TO MEET PAYROLL AND PURCHASES. SULEIMAN RETURNS JIDDA TOMORROW. NECESSITY FOR YOUR PRESENCE BECOMING URGENT. CAN OBTAIN ASTRALS FOLLOWING YOUR RETURN ONLY. YEMBO RESULTS CAN BE SENT WASHINGTON TEN DAYS FOLLOWING YOUR RETURN AND RABIGH LATER. PLEASE WIRE ARRIVAL DATE.

[redacted]-CORSON

HJCorson/s

Classification

OUTGOING TELEGRAM

RESTRICTED

TOUSFO 218

November 29, 1953

GLEN F. BROWN
FOREIGN BRANCH
U.S.GEOLOGICAL SURVEY
WASHINGTON, D. C.

From Corson and Jackson

EFFORT MADE TO HAVE SAG CONTINUE DRILLING UNDER PRESENT MANAGEMENT BEYOND DECEMBER 31 WITH SEPARATE WATER RESOURCES DEVELOPMENT CONTRACT. FINAL SAG ANSWER DUE TUESDAY BUT ROCHESTER DECISION TO SHUT DOWN DECEMBER 1 COMPLICATES ISSUE. SUGGEST YOU KEEP CLOSE CONTACT ROCHESTER. DRILLING CREWS LOSING PATIENCE AND REFUSE SAG OR GERMAN CONTRACTS. COMPLIANCE WITH DECEMBER 1 DEADLINE MEANS CREWS TO BE RETURNED JIDDA AND OUT OF COUNTRY IMMEDIATELY. SAG PROCRASTINATION PROBABLY DUE TO THEIR DESIRE TO HANDLE DRILLING PROGRAM AS GOVERNMENT AGENCY UNDER DEPARTMENT AGRICULTURE BUT SAG UNREALISTIC ABOUT NECESSITY FOR STATESIDE CONNECTIONS AND DEPOSIT ACCOUNT IN STATES TO MEET PAYROLL AND PURCHASES. SULEIMAN RETURNS JIDDA TOMORROW. NECESSITY FOR YOUR PRESENCE BECOMING URGENT. CAN OBTAIN ASTRALS FOLLOWING YOUR RETURN ONLY. YENBO RESULTS CAN BE SENT WASHINGTON TEN DAYS FOLLOWING YOUR RETURN AND RABIGH LATER. PLEASE WIRE ARRIVAL DATE.

CORSON

HJCorson/s

Initialed by: HJC
ROJ

OUTGOING TELEGRAM

UNCLASSIFIED

WIROM TOTEC #121

TO: FOA/W Sept. 14,1953

NOSEC.

Water wells drilled at Khulais under supervision Natural Resources Division are productive. Need irrigation engineer now. Advise status of his recruitment soonest. Wadi Khulais has water spreading possibilities.

DUNAWAY

HADunaway
WJEdens:o

INCOMING TELEGRAM

RESTRICTED

032011Z
September 3, 1953

TECTO 78

SECSTATE WASHINGTON

September 5, 1953
8:00 AM

RESTRICTED

Expanded Water Development Program.

TOTEC 764-582-60.

If SAG interested expanded water development program as outlined Minister Finance suggest plan FY 54 program $400,000 based on grownm budget of April 11, 1953.

STASSEN

ga

Distribution:

1-TCA - Action
1-Jones
1-File

UNCLASSIFIED

TOUSFO #185

Nov. 1, 1953

TO: FOA/W

FOR: William Johnston
Foreign Branch
U.S. Geological Survey
Washington, D. C.

NOSEC.

Please prepare Airpar forms in accordance with FOA TECTO Circular A-62 urgent for positions now being recruited for later for all positions. Submit FOA/Washington.

CORSON

HJCorson
ROJackson/djh

UNCLASSIFIED

Jidda, Saudi Arabia

May 25, 1952.

CONFIDENTIAL

OFFICIAL - INFORMAL

MEMORANDUM TO: Dr. Thomas A. Hart

FROM: Mr. Edward Betzig

RE: Natural Resources Field Party Proposed Water Well Drilling Program

The enclosure is a report to the Minister of Finance prepared by Glen Brown and George Wilson, Water Resources Engineer, Michael Baker, Jr., Inc., outlining the proposed water well drilling program.

It is an example of the practical results of the Natural Resources Mission's work and represents an important step forward in water exploitation and use.

Edward Betzig
Assistant Program Officer

Attach.

CONFIDENTIAL

Hart
(X-copy filed "Nat. Resources")

C
O
P
Y

File
X-copy

Jidda, Saudi Arabia

May 15, 1952

H.E. Minister of Finance
Kingdom of Saudi Arabia
Jidda

Your Excellency:

Herewith is a water resources program prepared by George Wilson, Water Resources Engineer with Michael Baker, Jr., Inc., and myself. It includes personnel, equipment and a drilling schedule in accordance with your wish that Baker take on the water-well drilling program. If you concur, would you kindly:

1. Approve a work order for Baker to design and begin construction by ordering the necessary material to build the drilling department warehouse, garage and compound.
2. Approve the recruitment as soon as possible of a mechanic and two drillers.
3. Approve the purchase orders so they may be placed in the hands of the Rochester purchasing office of Baker where the drilling superintendent and mechanic may assist them in filling the orders before coming to Arabia.

We are hopeful that the schedule for operating the rigs will be reviewed so that major alterations at a later time will not be made to handicap the execution of the program. The aerial mapping should precede test drilling in any locality; otherwise we are not using all the information needed to develop the limited supplies of the desert and may make serious mistakes. In the meantime I am pressing TCA for an early decision of the photography.

Please accept my respects.

(signed) Glen F. Brown
Glen F. Brown
Chief, U. S. Geological
Survey Mission to Saudi Arabia

Copy to
Dr. Stratton

C
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PROPOSED WATER WELL DRILLING PROGRAM

I. INTRODUCTION

The Saudi Arab Government has expressed its intention that its water well drilling operations be carried out by Michael Baker, Jr., Inc. (refer B. S. Fahoum memo to W. L. Anderson, dated May 4, 1952). The purpose of this report is to outline the work presently anticipated and to summarize the equipment and personnel requirements for carrying out the program. It is emphasized that since much of the work is of an exploratory nature it is impossible to make firm predictions or to place completely comprehensive orders. The program outlined is based on present information to serve as a guide. Any alterations, however, whether dictated by policy or expediency, will be brought to the attention of all concerned. The requisitions for personnel and material attached hereto have been prepared on the basis of fully equipping and manning the drilling rigs now on hand and on order, plus adequate pumps and pipe to implement small development projects in the next few months.

This program does not include a plan for maintenance and repair. With the installation of deep well turbine pumps in connection with development projects, it will be necessary to provide pump maintenance and repair service. This will logically come under Construction and Maintenance, and it is recommended that it be given early consideration, as the widely spread installations will present a considerable maintenance problem.

II. PROCEDURE AND PLANNING FOR A DRILLING SCHEDULE

The forward drilling program, as now planned, is shown in Table 1. The normal course of events for developing the water resources of any location are as follows:

C O P Y

a) Request of the Saudi Government to the U. S. Geological Survey Mission that a study of the region be made.

b) Geological reconnaissance by U. S. Geological Survey Mission.

c) Report of survey, with recommendation for test drilling if indicated.

d) Test drilling, test pumping, water analysis.

e) Analysis of all data and formal report prepared either by the Water Resources Engineer, or jointly by U. S. G. S. Mission and Water Resources Engineer or by U. S. G. S.

f) Development planning and engineering, if results are favorable.

g) Construction.

Most of the drilling scheduled for the next year will be exploratory, carried out in cooperation with the U. S. Geological Survey Mission to Saudi Arabia and for this reason the demand for pumps and casing will be appreciably less for that period. It is of the highest importance that this exploratory program be done as expeditiously as possible with development work held to a minimum until it is complete. Otherwise much water will be lost to the people of Saudi Arabia. It is of course, possible to drill a large number of unexplored and uncontrolled holes across the country, but it must be evident that the success of the water resources program should be measured by the amount of water made available, rather than by the number of wells or the footage of hole. One such well as can be developed in Shaib Ha' is worth more than a dozen dry holes or small producers.

III. PERSONNEL

There are at present three drillers operating for the Baker Co. in Arabia, with two more requisitioned. Since there are seven drilling rigs

on hand or on order, it is apparent that two more drillers should be requisitioned immediately. It is felt that there is no justification at present for requisitioning a diamond core drilling specialist, as projected activities involving this work are not extensive and one of the present drillers is a competent diamond core man.

The requisition for a drilling superintendent having been approved, recruiting will be started immediately. It is felt, however, that the salary specified - 800 dollars per month - will be inadequate to attract the type of man necessary to fill this position. It will undoubtedly be necessary to offer a higher rate, and this should be done immediately, rather than lose several months in a futile quest. Accordingly, it is suggested that the salary be left open, with a ceiling of 1000 dollars per month.

In view of the fact that it is intended to make the drilling operations self-sufficient, with separate compound and warehouse, it is recommended that an automotive mechanic be obtained from the United States. His responsibility would include supervising all automotive maintenance, assisting the drilling superintendent on rig maintenance and the ordering of automotive spare parts. When the section is completely equipped it will have twenty-nine vehicles, which would impose an impossible load on the existing facilities, making it necessary to employ another mechanic in any event. The drilling department, garage and warehouse should be staffed with Italian and Arab mechanics, welders, etc.

In addition to the usual helpers and laborers, each rig must be provided with a competent tindal who can speak reasonably good English, plus a cook-housekeeper. The drivers must be assigned to the drilling crew, rather than taken on loan from the motor pool, and must be used for additional duties when on location.

. EQUIPMENT, SUPPLIES, and MATERIAL

The material listed on the attached requisition falls into four categories, which are considered separately.

a) Transportation. Required as follows:

Star 83: 1 - 5 ton 6x6 flat rack. For rig.
1 - Power Wagon for hauling camping equipment, gasoline, personnel.

Star 72 (each):
1 - 5 ton 6x6 flat rack. For rig, Tulsa flat bed with hole, plate, and rollers.
3 - 15 ton semi trailer 6x6 trucks for hauling casing, screen, gasoline, diesel (a total of 3 for 4 rigs)
1 - Power Wagon for hauling camping equipment, personnel and pulling trailer.
1 - Air conditioned trailer.

Sullivan 300:
1 - 15 ton 6x6 truck to pull rig.
1 - 15 ton 6x6 truck to haul drill pipe, gasoline, etc.
1 - Power Wagon
1 - Air conditioned trailer.

Joy 150: 1 - 15 ton 6x6 truck to haul drill pipe, gasoline, etc.
1 - Power Wagon
1 - Air conditioned trailer.

Water Resources Staff and Utility:
Riyadh: Two Power Wagons
Jidda: Three Power Wagons, one station wagon.

In addition, 5 tank trucks, two of 3000 gallon capacity for rotary rig, three of 2000 gallon capacity for churn rigs, will be required to haul water for rotary rig operations and for cable tool operations where the water table is deep and an adequate supply remote.

	Total required	On hand	To order
5 - ton 6x6 flat beds	5	0	5
15 - ton semi trailer 6x6 trucks	6	0	6
Power Wagon	12	2	10
Tank trucks	5	1(3000 gal)	4(3 of 2000 gal. 1,3000 gal.)
Station Wagon	1	0	1
Air Conditioned trailers	7	0	7

The drilling rigs on hand or on order are considered to be sufficient for the present, provided that no extensive uncontrolled drilling program is added to the existing one. If developments of this nature arise, the entire drilling program, equipment orders, and cost estimates will have to

be revised according[illegible].

b) Housing:

A separate compound with cyclone fence and one gate is needed for storing and maintaining rigs and supplies in Jidda. A combination warehouse and garage with air conditioned offices for the drilling superintendent and head mechanic should be constructed in the drilling department compound. The warehouses should be of sufficient size to store parts, including tires for trucks, drilling rigs, pumps, motors, well screens and camping equipment. The garage should be of sufficient size and equipped with sufficient tools to make all repairs on the rigs and trucks, to fabricate special drilling tools, to dress and built up worn bits, etc. The yard space should be sufficient to store rigs,trucks, drill stem, casing, fishing tools, etc.

c) Development material and equipment, general stock.

The deep well turbine pumps, pipe, and fittings listed on Requisition R-123-J are necessary to provided a working stock of general items necessary for development projects of a minor nature. The desirability of having a basic stock of this nature on hand has been most apparent during the current emergency water program in Riyadh. No provision for a stock of pipe of over 8 inch diameter or of pumps with a capacity of over 250 gpm has been made at this time, as it is felt that larger project should be handled individually. It may, of course, become necessary or desirable to alter this policy at a later date

d) Drilling tools, hand tools, and casing.

The drilling tools and hand tools have been ordered with a view to making each rig reasonably self-sufficient in the field. At the same time, every effort has been made to avoid unnecessary duplication of little-used items.The very complete listing of hand tools represe an excellent investment,since with these/a competent driller can effect repairs on field expedient[illegible] which would otherwise re[illegible]ire a return to base camp.

Additional hand and machine tools will be required for the shop, and it is recommended that these be requisitioned by the drilling superintenden and the mechanic prior to their depature from the United States. The mechanic should also place orders for spare parts for all automotive equipment on order for the section.

e) Camping equipment and miscellaneous supplies.

Too much emphasis cannot be placed on the necessity for providing the drilling drews with adequate camping equipment. No competent driller will continue to operate in the field for any length of time under their present living conditions, and adequate provision for their health and comfort must be made as soon as possible. The cost of replacing drillers is large enough to justify keeping morale as high as possible.Even with all the comforts that might be supplied to a temporary camp the working conditions are still extremely difficult.

Kerosene refrigerators in particular should be expedited.The drillers will spend about 90% of their time in the field,and the provision of fresh food is a necessity.

Medical kits complete with instruction pamphlets are also urgently required. It is emphasized that an ordinary first aid kit is not adequate for a crew operating heavy equipment several hundred miles from medical attention. It is further recommended that as time permits each driller be instructed in first aid and the diagnosis and treatment of such probable ailments as malaria and dysentry.

Air conditioned all metal trailers for living quarters are now standard equipment for drillers in hot countries. Light metal trailers can be pulled with power wagons to drilling sites and will permit drilling operations under the extreme desert conditions anticipated.Without mobile air conditioned

quarters it will be impossible for us to carry on continuous operations.

Trans-receiver radios are necessary for day to day supervision and reporting on the drilling operations. These should be the same type and of the same frequency as the Geological Survey radios on order, the trans-receiver in the Geological Survey office to be available to the drilling superintendent and Mr. Wilson for conversations with drillers in the field. Radio communication is vital for most efficient use of the drilling crews, for ordering parts, repairs, reporting on geological conditions, timing of electric logging, emergencies, food supplies for drilling crews, and so on.

(signed) George Wilson

George Wilson
Water Resources Engineer
Michael Baker Jr., Inc.

(signed) Glen F. Brown

Glen F. Brown
Chief, U. S. Geological Survey
Mission to Saudi Arabia

C
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P
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PERSONNEL

ADMINISTRATION

Chief Engineer, MBJI

John McCormack

Plans Engineer, MBJI

F. D. Garretson

OPERATIONS

Chief, U. S. G. S. Mission

Glen F. Brown

Water Resources Engineer

George Wilson

Drilling Superintendent

On order

Senior Mechanic

Approval for recruiting requested.

Drillers

1. Walter Wissinger
2. Frank Drake
3. Wayne Hanlon
4. On order
5. On order
6. Approval for recruiting requested.
7. Approval for recruiting requested.

C
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Table 1 - SCHEDULES OF WATER WELL DRILLING

JIDDA

(No.1)	Star 72 (No.2)	Star 72 (No.3)	Star 72(No.4)	Sullivan 3000	Joy 150
as soon as le for dril- gricultural at ABu Abrish, or Joy 150)	Leave as soon as possible for Afif Taif Railroad wells	To Taif Wadi Tathlith Wadi Bisha Railroad wells	Wadi Fatima Wadi Habauna	Yenbo, then back to shop for alteration overhaul, mounting Rabigh Hadda esh Sham Usfan	Qizan for municipal supply Qunfida Lith Wejh Umlejj

RIYADH

Star 83

Completion of test holes at Hayyir
Wells at Al Kharj
Production wells at Hayyir
Anaiza - Buraida

The type of rig and number of holes at Hali, Yuba, Qunfida, Lith, Rabigh, Wejh, Um Lejj, Anaiza, Buraida, should be determined after aerial photography and geologic mapping is accomplished. In the meantime we shall do the best we can.

This does not include wells scheduled at Riyadh and Al Kharj which are now being drilled by Aramco or by contractors under Aramco supervision. A separate schedule can be made for that work.

(2)

TELEGRAM

Foreign Service of the
United States of America

OUTGOING

Priority

CHARGE:

RESTRICTED
Classification

Control: TOUSFO ~~xx~~ 225

DATE: December 9, 1953.

FOA/W

FROM JACKSON TO GLEN BROWN

CORSON NOW IN ISTANBUL AND SUPPOSEDLY UNAWARE BROWN-BAKER PLAN. SUGGEST BROWN RETURN JIDDA VIA ISTANBUL AS FOA-EMBASSY JIDDA PLAN AT CONSIDERABLE VARIANCE. MINFIN STILL IN RIYADH. ADVISE BROWN ETA JIDDA.

BODE

JBode
ROJackson/s

Classification

Walt Daniel (2)

TELEGRAM

Foreign Service of the
United States of America

OUTGOING

RESTRICTED
Classification

CHARGE:

Control: TOUSFO #221

FOA/W

DATE: December 6, 1953

For Taggart

NOSEC.

Baker/Jidda received from Baker/Rochester following cable QUOTE Brown has asked MiBaker Water Resources Department if we would continue under new contract for and with his department. We have advised him we would gladly do so and assume all men there now would continue with us. Glen has proceeded on this and hopes to have our letter of intent soon pending formal contract. Suggest you do not surplus any men in our Water Resources Department until this is definite one way or other in about a week UNQUOTE.

Suggest you inform Brown contents our joint cable 261 December 3 stressing fact Minister Finance has instructed Govenco do drilling and drillers refuse Govenco contract. SAG has ordered Baker drillers surplused prior December 31 overruling Rochester request.

Brown-Baker plan possibly unacceptable to SAG but unfeasible approach SAG until details program and U.S. intentions are known. SAG attitude appears arbitrary in Govenco deal. SAG concurrence essential to Brown-Baker plan whether on basis FOA solely employ drillers or bear entire capital expense of program.

CORSON

RJCorson:o

RESTRICTED
Classification

☆ U. S. GOVERNMENT PRINTING OFFICE: 1952 - 220210

Water Drilling

TELEGRAM

Foreign Service of the
United States of America

OUTGOING

Foa

RESTRICTED

CHARGE: Classification Control: 261

SECSTATE

DATE: Dec. 3, 1953

Joint Embassy - USACM Message. Pass FOA/W

Assistant Deputy Minister for Finance, Abdul Aziz Sulaiman, informed USACM liaison officer/that Abdullah Sulaiman, Minister Finance and Economy, has decided future water drilling will be carried out by Govenco (Government Engineering Co., components Hansa Stahl Export Co. Julius Berger, A.G., both of Dusseldorff). Govenco expected replace Baker upon termination latter's contract SAG December 31. We are informed American drillers now employed Baker refuse work for Govenco or SAG.

If Minister Finance persists his plan utilize Govenco drillers, we fear there will be long interruption drilling activities during changeover period due difficulties recruiting qualified drillers for work Saudi Arabia. Such interruption drilling activities would not only endanger success present drilling program but also adversely affect full utilization special economic aid funds earmarked for water development. Drilling equipment left in field during changeover would deteriorate rapidly, thus resulting further delay. Also doubt advisability making available to other than American contractors technical data, aerial maps and mosaics prepared by USACM technicians.

USACM has strongly emphasized Abdul Aziz vital importance uninterrupted drilling program, who in turn discussed question with Minister. Both Embassy and USACM will continue efforts impress importance this question upon SAG. ¶ In order permit USACM participation selection drilling contractors and strengthen its ability minimize drilling interruption, request:

(1) Transmission Embassy final draft notes setting up 1954 technical assistance and economic aid programs (USFOTO 143, November 20);

(2) Instructions be given Embassy proceed immediately thereafter exchange notes establish cooperative service type agreement as prescribed TCA Manual dated September 1, 1953.

JONES

HJCorson/JJJones/wbg

RESTRICTED

Classification

Walt

TELEGRAM

Foreign Service of the
United States of America

OUTGOING

CHARGE:

RESTRICTED
Classification

Control: TOUSFO 218

DATE: November 29, 1953

GLEN F. BROWN
FOREIGN BRANCH
U.S.GEOLOGICAL SURVEY
WASHINGTON, D. C.

From Corson and Jackson.

EFFORT MADE TO HAVE SAG CONTINUE DRILLING UNDER PRESENT MANAGEMENT BEYOND DECEMBER 31 WITH SEPARATE WATER RESOURCES DEVELOPMENT CONTRACT. FINAL SAG ANSWER DUE TUESDAY BUT ROCHESTER DECISION TO SHUT DOWN DECEMBER 1 COMPLICATES ISSUE. SUGGEST YOU KEEP CLOSE CONTACT ROCHESTER. DRILLING CREWS LOSING PATIENCE AND REFUSE SAG OR GERMAN CONTRACTS. COMPLIANCE WITH DECEMBER 1 deadline means crews to be returned jidda and out of COUNTRY IMMEDIATELY. SAG PROCRASTINATION PROBABLY DUE TO THEIR DESIRE TO HANDLE DRILLING PROGRAM AS GOVERNMENT AGENCY UNDER DEPARTMENT AGRICULTURE BUT SAG UNREALISTIC ABOUT NECESSITY FOR STATESIDE CONNECTIONS AND DEPOSIT ACCOUNT IN STATES TO MEET PAYROLL AND PURCHASES. SULEIMAN RETURNS JIDDA TOMORROW. NECESSITY FOR YOUR PRESENCE BECOMING URGENT. CAN OBTAIN ASTRALS FOLLOWING YOUR RETURN ONLY. YEMBO RESULTS CAN BE SENT WASHINGTON TEN DAYS FOLLOWING YOUR RETURN AND RABIGH LATER. PLEASE WIRE ARRIVAL DATE.

[illegible]-CORSON

RJCorson/s

Classification

Water

U.S. Operations Mission
to Saudi Arabia
Jidda

November 16, 1953

Mr. Roy Jackson
El Darb, Saudi Arabia

Dear Roy:

Mr. Cox delivered your note of November 10 and we are glad to know of the success with wells #4 and #5. If #6 to be drilled between #4 and #5 is successful as a producer, it seems that further drilling west of the silt area is sufficient until more concrete plans have been made for land development.

As I understand, well #1 is on the eastern edge of the silt area west of El Darb, and well #4 is on the western edge. In discussing further drilling with Mr. Corson, the question was raised relative to drilling a test well in the silt area east, or northeast of well #4. It is our opinion that such a well should be drilled unless there is some reason why the effort would be of no value.

Mr. Cox tells me there is much green vegetation growing this year. I should like to see the area when it is quite different from what it was last November.

Sincerely,

W. J. Edens
Chief, Agriculture Division

WJEdens:o

File 1

U.S. Operations Mission
to Saudi Arabia
Jidda

October 17, 1953

MEMORANDUM

TO: Donald F. Dougherty, Acting Chief,
Natural Resources Division

FROM: Fuad Najjar, Acting Director,
Liaison Office for Technical Assistance

SUBJECT: Wells in Gizan

I have been requested by the Assistant Deputy Minister of Finance to submit a report on the two wells that have been drilled in Gizan for the water supply of the city. This report is to include answers to the nine points listed below. I shall appreciate your assistance in making this information available.

1. Are the two wells in Gizan considered good and suitable to supply Gizan with pure water?
2. Does the water of these two wells need purifying or not?
3. Result of analysis as to purity of water.
4. Result of chemical analysis of water.
5. Results of pumping tests (date of pumping, period of pumping, quantity of water, difference of water level in the wells during pumping operation).
6. Proportion of water level in the well before and after pumping.
7. Does the water level in the two wells during last hours of pumping stop at a certain point?
8. Formation of ground and water bearing strata.
9. Depth and diameter of wells.

FNajjar:o Fm

Water Devel.

File 1 —
2
Chron.

FOREIGN OPERATIONS ADMINISTRATION
Jidda, Saudi Arabia
September 27, 1953

Mr. Fuad Najjar, Acting Director
Liaison Office for Technical Assistance
Jidda, Saudi Arabia

Dear Sir:

I have been informed that a survey has been ordered for a pipe line from the well drilled in Wadi Agrab (near Taif) to Hawiyah, for the purpose of supplying water to Hawiyah. I understand also that a survey party is already at Taif to make the survey.

While we have no desire to interfere in any way with the Saudi Arabian Government, it must be pointed out that this survey was not recommended by anyone in the Natural Resources Division of TCA, nor for that matter, by anyone in TCA. It is necessary to point this out for the following reasons:

1. The well in Wadi Agrab has not been adequately tested nor has the water been analyzed. There is thus no assurance that there is sufficient quantity or that the water is of suitable quality to justify a pipe line.

2. Exploration drilling in the areas adjacent to Hawiyah has not been completed. No recommendations for a water supply for Hawiyah should be made until all possible data is available unless there is an emergency. This office has no knowledge of such emergency.

3. The wells drilled in Wadi Agrab were not originally intended as water wells but to examine the underground structure to determine suitability of foundations for an underground dam. It would seem that no money should be spent on a pipe line until a decision is made on whether or not the dam is to be built.

Again may I emphasize that while we have no desire to interfere, we do want to be on record as to our opinions in this matter, so that if difficulties later arise, it will be perfectly clear that this work was not based on our recommendations.

Sincerely yours,

Donald F. Dougherty
Acting Chief,
Natural Resources Division

DFD
DFDougherty:c

NR - Water

TELEGRAM

Foreign Service of the
United States of America

OUTGOING

File 1
2
Chron III

UNCLASSIFIED
Classification

CHARGE:

Control: WIRON TOISC #121

TO: FOA/W

DATE: Sept. 14, 1953

NOSEC.

Water wells drilled at Khulais under supervision Natural Resources Division are productive. Need irrigation engineer now. Advise status of his recruitment soonest. Wadi Khulais has water spreading possibilities.

DUNAWAY

JADunaway
WJEdens:o

UNCLASSIFIED
Classification

☆ U. S. GOVERNMENT PRINTING OFFICE: 1952 - 220210

Water
Program File 1
2
Chron.

American Embassy
Jidda, Saudi Arabia

September 10, 1953

Badr bey Fahoum
Government Representative
Michael Baker, Jr., Inc.
Jidda, Saudi Arabia

Dear Sir:

It is recommended that a pumping test at Wejh be deferred temporarily for the following reasons:

1. The only pumps available at present are 5" centrifugal pumps which might very easily have a capacity larger than the well, in which case the pumping test would be inconclusive. The only thing that would be definitely known would be that the capacity of the well was less than that of the pump.

2. There is no assurance that the depth of water in the well is sufficient to submerge the impeller bowl of the pump, especially under conditions of drawdown which would be in effect after pumping was started. Most dug wells have a relatively shallow depth below the water surface.

3. Pumps suitable for this type of well are already on order. It is suggested that when the pumps are received, a pumping test be made at the time the pump is installed to provide data for use in preparing a recommended operating schedule and to insure that everything is in proper working condition. At that time any local personnel who will be used in operating the pump can be given instructions in proper operation and maintenance.

In the meantime it appears that Dr. Brown's estimate that the capacity of the well is sufficient for the needs of Wejh can be safely relied upon. In fact, it is more than an estimate since the well now supplies the entire town.

Sincerely yours,

Donald F. Dougherty
Acting Chief, Natural Resources
Division

DFDougherty:o

Natural Resources. Water Program

File 1
2
Chron.

Jidda, Saudi Arabia

September 9, 1953

MEMORANDUM

TO: Mr. D. F. Dougherty
Acting Chief, Natural Resources Division

FROM: Richard G. Bogue
Geologist

SUBJECT: Lith Water Supply

A request was received from the Assistant Deputy Minister of Finance to investigate the possibilities of a water supply for the town of Lith. It was thought that the well, called Bir Assalia, might possibly furnish enough water.

The period from August 26 to September 4 was spent in the vicinity of Lith investigating the possibilities of water in the area. The Emir of Lith, Ibrahim Bin Mokran, and the Director of the Finance Department of Lith, Hamza Hashim, were both very helpful and cooperative.

The well, Bir Assalia, and the surrounding area were examined and it is recommended that this well not be considered as a water supply for the town of Lith. The well is in schistose rocks and would probably not yield enough water.

The areas to the north and south of Bir Assalia were examined and the best possibilities to drill and develop wells were found in Wadi Lith. Three sites were chosen, two near Bir Shabwa at the confluence of Wadi Beithahn and Wadi Lith, and the other in the main channel of Wadi Lith.

Site 1 - Located 100 feet north of a blazed tree which is 100 feet northward from Bir Shabwa.

Site 2 - Located 100 feet north of blazed tree which is between 800 and 900 feet southeast of Bir Shabwa.

Site 3 - Located approximately 2½ kilometers southeast of Bir Shabwa. The site is on a sandy knoll in Wadi Lith. There is a blazed tree 600 to 700 feet north of the site.

All three sites were shown to Abdullah bin Hamdan, a guide on the staff of the Emir of Lith.

It is recommended that the well at Site 3 be drilled first as this place offers the best possibilities of a single well producing enough water to supply the town. There is a good reservoir site on the small hill on the north side of the Wadi. The airline distance from Lith to Site 3 is between 13 and 14 kilometers (scaled from aerial photography). The difference in elevation between the site and Lith is not known. An attempt was made to measure the elevation difference with an aneroid barometer, but the unsettled weather made the readings unreliable.

It is recommended that this well be drilled and a pumping test made to determine the amount of water. If the amount of water is sufficient, a survey may then be made for the pipe line and reservoir site.

The distance from Lith to Sites 1 and 2 is approximately the same, between 13 and 14 kilometers, and there is a good reservoir site on the west side of Wadi Beithahn. However, it is believed that it will not be necessary to drill wells at these two sites.

RGBogue:o

Water
Prog

Jidda, Saudi Arabia

OFFICIAL - INFORMAL
UNCLASSIFIED

September 6, 1953

Dear Mr. Taggart:

This has reference to your transmittal slip of August 12, 1953 concerning the nomination of Mr. Billie H. Rountree as a candidate for the position of Agronomist. I have read carefully the personal history summary of Mr. Rountree, and it is my opinion he is qualified for the position. I should appreciate your requesting that his recruitment be expedited. We shall be glad to request country clearance at the appropriate time.

Various communications on water spreading have arrived. Mr. Schwan and I had been discussing this matter in relation to range management problems in Saudi Arabia. This means of better utilizing rainfall has considerable merit, and I think it should be exploited as far as it is economically feasible. Also, it is our opinion here that it has much possibility for increasing production for people in settled villages. All of the villages in this country are found on wadis except a few on the Persian Gulf side where there are some natural springs and artesian wells.

One of our needs is a member of the agricultural staff who knows how to get the periodic raging waters of the wadis out and onto the land. Such know-how is found in the engineer who has had the essential technical training and practical experience. At present, this type personnel recruitment for Saudi Arabia has been suspended by the TCA/W office, though I have over and over attempted to make it known that 98% of food plants in Saudi Arabia are produced by irrigation where the water comes from wadis.

We note with interest the appointment of Mr. Corson. Under his leadership, I sincerely hope Point 4 in Saudi Arabia will be most progressive and fruitful in its program of work.

Best regards to you, Thel Taylor, and others on your staff.

Sincerely yours,

William J. Edens
Chief, Agriculture Division

Mr. Paul F. Taggart,
Chief, Iraq-Jordan-Saudi Arabia Branch,
Near East and African Development Services (TCA),
Foreign Operations Administration,
Washington 25, D. C.

WJEdens/djh

7/5 Water Devel.

SECSTATE WASHINGTON

0320112
September 3, 1953

TECTO 78

RESTRICTED

September 5, 1953
8:00 AM

Expanded Water Development Program.

TOTEC 764-582-60.

If SAG interested expanded water development program as outlined Minister Finance suggest plan FY 54 program $400,000 based on grownm budget of April 11, 1953.

STASSEN

ga

Distribution:

1-TCA - Action
1-Jones
1-File

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File TCA

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032011Z
September 3, 1953

TECTO 78

RESTRICTED

September 5, 1953
8:00 AM

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1-Jones
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RESTRICTED

Water Devel

SECSTATE WASHINGTON

032011Z
September 3, 1953

TECTO 78

RESTRICTED

September 5, 1953
8:00 AM

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STASSEN

ga

Distribution:

1-TCA - Action
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File 1
2
Chron.

American Embassy
Jidda, Saudi Arabia

August 27, 1953

Mr. Clark Majors
Michael Baker, Jr. Inc.
Jidda, Saudi Arabia

Dear Mr. Majors:

With reference to well locations near Hawiya (Taif), one site was located at the junction of Wadi Sayl Kebir and Wadi Rahab. This is one mile west of the village and gardens of Wadi Rahab. The site was marked with a pile of rocks and a tree 90 feet north of the site was blazed. This well should be drilled first and if there is not sufficient water, another should be drilled 500 feet north of the blazed tree, but still in the wadi confluence.

The second site is at the junction of Wadi Sayl Kebir and Wadi Gehrn. The place was marked with a pile of rocks located 60 feet south of the blazed tree. This site is not readily accessible and should not be drilled until results from the above location have been studied.

Both places were shown to you and Mr. Ford.

Very truly yours,

Donald F. Dougherty

Richard G. Bogue

cc: Glen F. Brown
Sadek Husseini
Badr bey Fahoum

E70

DFDougherty:o

Natural
Resources
Water
Program

File 1 —
2
Chron.

American Embassy
Jidda, Saudi Arabia

August 20, 1953

Mr. Clark Majors
Michael Baker, Jr., Inc.
Jidda, Saudi Arabia

Dear Mr. Majors:

Two well sites have been chosen in the vicinity of the village of Suq al Ahad which is about 10 miles east of the town of Qunfidha.

The first site is approximately one-half kilometer west of the market and 50 feet north of a blazed tree. The blaze on the tree was marked with "Q 1" and a strip of white cloth was tied on the tree.

The second site is one-half kilometer northeast of the village and 125 feet south of a blazed tree. The blaze on the tree is marked "Q 2".

These two sites were shown to Musa'd Saleh and Abeid el Badi who live in the village of Suq al Ahad and offered to guide the drillers to both sites.

Very truly yours,

RICHARD G. BOGUE
GEOLOGICAL SURVEY

Richard G. Bogue
Geologist

Copies to -
Glen F. Brown
Sadek Bey Husseini
Badr bey Fahoum

RGBogue:o

UNCLASSIFIED

Natural
Resource
(Wat

UNITED STATES OF AMERICA
TECHNICAL COOPERATION ADMINISTRATION

Current Date **July 26, 1953**

X Agri

TELEGRAM RECEIVED

Date Sent: **July 24, 1953**

Number: **Priority TECTO 42**

FROM: **SECSTATE WASHINGTON**

Date Received: **July 25, 1953**

IN AGREEMENT WITH SAG REYNOLDS METALS COMPANY PLAN ESTABLISH IRRIGATION DEMONSTRATION PROJECT NEAR RIYADH. PROJECT TO DEMONSTRATE USE OF ALUMINUM FOIL AS MULCH AND ALUMINUM IRRIGATION PIPE TO CONSERVE WATER AND INCREASE AGRICULTURAL PRODUCTION. REYNOLDS PLANS SEND PERSONNEL AND CONSIDERABLE EQUIPMENT VIA AIR NEAR FUTURE. ADDITIONAL DETAILS FOLLOW.

STASSEN

TCA DISTRIBUTION:

f-1 Edens
f-2 Natural Resources
~~f-3~~
CHRON III
ACTION BY:

UNCLASSIFIED

EDENS

Water Program File
Natural Resources Div.

American Embassy
Jidda, Saudi Arabia

MEMORANDUM

July 8, 1953

TO: Mr. Clark Majors
Michael Baker, Jr., Inc.

FROM: Richard G. Bogue
Natural Resources Div., TCA

SUBJECT: Well Locations - Wadi Khulais

Four more sites for wells were located in the eastern part of the Wadi Khulais area. Three of these sites are across the valley of Wadi Murwani and are marked with stakes and piles of rocks. The sites are labeled C-1, C-2 and C-3.

Site B, in my letter of June 18, was moved about 1,000 feet to the northeast.

Site D is located approximately 2-1/4 km west of Test Well No. 3 (Location A in letter of June 18).

All of the locations were shown to Mr. Anderson.

I would like to suggest that the well at Location B be drilled next and then C-1. When these two holes are down and the amount of production known the program should be reviewed.

cc: Glen F. Brown
Sadek Bey Husseini
Badr bey Fahoum

RGBogue/djh

Natural Resources
Water Program

UNITED STATES OF AMERICA
TECHNICAL COOPERATION ADMINISTRATION
Jidda, Saudi Arabia

June 28, 1953

MEMORANDUM TO: Mr. John A. Dunaway
Acting Director -TCA

FROM: Glen F. Brown
Chief, Natural Resources Division

Glen Brown

RE: Transmittal of the Yenbo Report.

Herewith is report on water supply for Yenbo. If you approve kindly pass on to the Liaison Office for translation.

A map is being prepared by Mr. Goudarzi and should be ready by the time the report is translated.

Yenbo Report addressed to

H.E. Minister of Finance
Kingdom of Saudi Arabia
Jidda

Given to Sadek Husseini for translation and transmittal
6-28-53.

JAD

After this water was collected the well has become progressively saltier, and when we pumped it for five days recently it analyzed as follows:

Calcium(Ca)	500
Magnesium(Mg)	156
Bicarbonate (HCO_3)	83
Chloride (Cl)	1960
Sulfate (SO_4)	400
Sodium (Na)	626
Total solids	3725 ppm

At the present time the water can be used for growing dates, according to Mr. Hamilton, agronomist with Aramco, provided gypsum is added to the soil after a period of irrigation. I have asked the driller to leave the casing in the ground so that it may be used for irrigation. In exceptionally rainy years the water may be drinkable when it could serve as an auxiliary supply for the town.

Despite the additional cost plus the withdrawal of water needed for date gardens, it now appears that the Eyun at the junction of Wadis Nakhli and Fara'a, namely Eyun Sha'atha, Ali Harbiya, and Ajlan are the nearest sources of fresh water for the town supply.

On receiving aerial photographs of the Yenbo block I proceeded there and examined every possibility for a water supply for the town. I was most hopeful of finding a new source, so that the ever-diminishing waters of Yenbo Nakhl could be utilized for the growing of dates. I have reluctantly, after much study and test-drilling, been forced to the conclusion that the nearest supply of fresh water in sufficient quantity for the town lies in the gravels of Yenbo Nakhl.

I would like to suggest that you consider the possibility of drilling wells in Yenbo Nakhl below these dibbula so that the water which seeps down towards the sea and becomes brackish may be utilized as much as possible for the town supply. This water is lost and serves no useful purpose other than stock watering below Ein Mubarak and a line can be laid from wells to the stock-watering points if necessary. In the meantime a survey can well be made of the pipe-line to Eyun Sha'atha, Ali Harbiya and Ajlan and a beginning made in cleaning out the old dibbula. If the test-drilling is succesful wells can be installed so as not to affect the sweet-water dibbula and the gravel drained in such a manner as to allow maximum recharge in time of flood.

This plan has been discussed with HE Abdul Aziz bin Sulaiman, and with Sheikh Mohammed bin Jabir, owner of Ein Mubarak. Both HE the Deputy Assistant Minister of Finance and Sadek bey Husseini know what we are attempting to do and I hope that you will have an opportunity to discuss this with them if this letter is not clear.

I am anxious to go to the United States for a much needed rest and I hope that your plans for the drilling program materialize. In the event that I can be of any assistance, your Ambassador in Washington can reach me through the Geological Survey in Washington.

Please accept my respects and wishes for your good health.

Glen F. Brown

Glen F. Brown
Chief, Natural Resources Division
T C A

file
B

Natural Resources
Water Bog

TECHNICAL COOPERATION ADMINISTRATION
Jidda, Saudi Arabia

June 27, 1953

Mr. Clark Majors
Drilling Superintendent
Michael Baker, Jr., Inc.
Jidda

Dear Mr. Majors:

The two wells at Um Lajj should be tested by pumping with suitable pumps. Probably Mr. French could interupt drilling at Yenbo when the pumps are available.

The drilling for Yenbo is planned as follows:

Two or possibly 3 holes in Wadi Fegir on the SE side of Wadi Yenbo, while Mr. Goudarzi maps and studies the dibbula in Yenbo el Nakhl. A series of test holes will then be drilled in Yenbo el Nakhl to determine the amount of water being lost by salt increase in the lower end of the wadi. Great care must be exercised in the drilling of the test holes in Yenbo el Nakhl to avoid drilling thru dibbula. If a dibble is encountered the drill should be stopped and the rig moved over a few feet to avoid the tunnel. These wells should have 8 in. or larger casings, preferably larger, in order to test the safe yield of the gravels and possibly to serve as production wells. On the completion of the test-drilling the rig will then procede to Rabigh and drill in three places already shown to you and the driller on the aerial photograph. Mr. Bogue will help the driller in the location of the test sites for a water supply for Rabigh. All of the known possibilities are 20 or more kilometers east of Rabigh.

As soon as a driller is available the drilling should continue at Khulais. One of the new rigs could be assigned here with the understanding that later it would be sent to the Qasim. This will give us a chance to study the geology in the Qasim area this fall ahead of the drilling. Mr. Bogue will help with location of additional wells in this area.

After the test-drilling is completed at Agrab near Taif a well or two should be left with casing in the hole so that water levels can be measured. Unusual rains this fall will probably show more water than would be encountered in dry years and we must get some measure of fluctuations before recommending this as a source for Hawiya. The wadis northeast of Taif in the region of Sail Kebir but as close to Hawiya as possible should be test-drilled now that we have photo coverage. Either Mr. Bogue or Mr. Goudarzi will help in the location of these test-holes.

One of the new rigs should be sent to Gizan as soon as possible. If Mr. Cox has not drilled the two test holes at Darb the new rig should stop enroute and drill these. If Mr. Cox is drilling at Darb the new rig should go the FAO campsite and drill a well for camp supply then procede with the exploration

drilling/

drilling for the FAO project. In the event that large quantities of ground water is found at Darb one rig would do development drilling there while the other two rigs would continue on the Gizan development. Drilling north of the lava in the vicinity of Wadis Hali and Yiba should be deferred until Mr. Jackson returns so that his geologic work will guide the drilling.

The rig drilling production wells at Hayyir should drill up Wadi Ha in the direction of Dhruma as described in Mr. Wilson's report on the Riyadh water supply.

Sincerely yours,

Glen F. Brown

Glen F. Brown
Chief, Natural Resources Division - TCA

cc to: Mr. Dunaway ✓
Mr. Husseini
Mr. Lannan
Mr. Dougherty

File

Water
Program.

American Embassy
Jidda, Saudi Arabia

MEMORANDUM June 16, 1953

TO: Mr. Clark Majors
Michael Baker, Jr., Inc.

FROM: Richard G. Bogue
Natural Resources Div., TCA

SUBJECT: Well Locations - Wadi Kulais

Two sites were located, one (Location A) is approximately one kilometer northeast of Test Well No. 2 (the well just completed and tested by Mr. Cox). The other site (Location B) is three kilometers southward from Test Well No. 2. Mr. Cox was with me and knows where both of the sites are located.

At Location A, it is suggested that when the hole reaches the bottom of the gravels, a pumping test be made. After this is done the hole should be deepened between 75 and 100 feet into the shales and another pumping test be made. If this is done there will be some data on the amount of water in, or may be expected from, the shale formation.

No depth is suggested for the hole at Location B at the present. If it is found in the hole at Location A that there is ground water in the shale formation this hole should go down. If the yield of water from the shale is low or nil the hole should be stopped at the bottom of the gravels.

R.G. BOGUE

cc: Glen F. Brown
Sadek bey Husseini
Badr bey Fahoum

RGBogue:djh

water Progra

File 1—
2
CHRON.

Jidda, Saudi Arabia

June 17, 1953

Your Excellency:

The testing at Um Lajj has found a supply of fresh water sufficiently large for the town. Accordingly, Your Excellency can dispatch a surveying crew to map a water line from the well to a reservoir site on a limestone bench on the east side of the town. The westernmost bench which is nearest the town is 10 meters higher than the second floor of the Emir's house, according to our altimeter survey, and a reservoir located on this bench should supply sufficient pressure to adequately furnish flowing water throughout the town. A reservoir and distribution design could be made at the same time.

A relief well is being drilled near the well just completed. As soon as the quality and quantity of the water in the relief well is known, the pumps may be ordered.

Please accept my respects.

Very truly yours,

Glen F. Brown
Glen F. Brown
Chief, Natural Resources
Division

His Excellency,
The Assistant Deputy Minister of Finance,
Kingdom of Saudi Arabia,
Jidda.

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Request to S. Husseini for translation & transmittal 6/17/53

GFBrown:o

Water Proj

File 1
2
CHRON.

Jidda, Saudi Arabia

June 16, 1953

Your Excellency:

I have followed the ancient dibble 3 kilometers north of Rayis for a distance of 7 kilometers. The water in the ancient funnel flowed from east to west, coming from one of the splays of Wadi Safra. East of the Yenbo-Rabigh road there is a small plaster (juss) lined reservoir on the south side of the dibble. The easternmost "manholes" end near three mounds of earth and what looks like part of an ancient wall, evidently a very old dwelling site in a drainage line coming from Wadi Safra. The west end of the invisible manhole is 1-1/2 kilometers west of the Yenbo-Rabigh road. The old ruins of Sharm Buraiqua are due west of the road about 6 kilometers.

Water for any development at Rais or Buraiqua would most likely come from Wadi Safra. The water in this wadi, like others in the Hejaz, becomes progressively saltier downstream, and test drilling plus careful mapping of the dibboula is needed to obtain and use the water before it becomes brackish.

Please accept my respects.

Very truly yours,

Glen F. Brown
USGS - TCA Field Party

H.E. The Assistant Deputy Minister of Finance,
Kingdom of Saudi Arabia,
Jidda.

File 1 - Water Program
File 2
Chron.

Jidda, Saudi Arabia

June 16, 1953

Your Excellency:

Mr. MacNaughton told me that you were anxious to have more information regarding use and possible treatment of water from Dahl Hitt. Accordingly, I inquired from the Quality of Water Branch in the Geological Survey as to use and possible treatment of this water.

It appears that the Dahl Hitt water can be used for irrigation purposes provided the soil is porous and well drained. A soils man should examine the soils in the area below the cave on the flood-plain of Wadi Sulaiy.

The water can probably be treated for drinking purposes, reducing the salts to 500 p.p.m. using a two-bed anion-cation exchange process at a cost of possibly $1.00 per 1,000 gallons, but the exact cost is difficult to estimate. A million gallons a day or about ten gallons per person in Riyadh would cost 3680 riyals daily or 1,343,200 riyals per year for treatment alone. Actual cost of water would be considerably more requiring construction of a 30 kilometer pipeline and lifting water considerably higher than Hayyir.

Please accept my respects.

Yours very truly,

Glen Brown
Glen F. Brown
Chief, Natural Resources
Division

His Excellency,
The Minister of Finance,
Kingdom of Saudi Arabia,
Riyadh.

for

Sent in for translation& transmitta
6-17-53

GFBrown:o

Natural Resources. File
Water Prog

American Embassy
Jidda, Saudi Arabia

June 14, 1953

MEMORANDUM TO: Mr. John A. Dunaway, Acting U. S. Director

FROM: Glen Brown, Chief, Natural Resources Divsion Glen Brown

RE: Darb Project

Test drilling for ground water is not yet complete. The drilling of three holes found a small supply of fresh water in one of them sufficient for a camp supply. There remain two test holes to prove or disprove large supplies of ground water beneath the eastern edge of the coastal plain. Drilling has been very slow because of injury to one driller and an attack of malaria by a second driller, plus difficult weather conditions. The second driller has been instructed to move his rig to the two remaining test sites and may be there drilling now although we have no communications. Radios on loan from Navy, urgently needed for Darb project, were delivered here two weeks ago minus power supplies, antennaes, cables, headphones or speakers, and only one of two needed rectifiers for each transmitter. The drilling department has patched up one set, borrowing missing equipment from the Saudi Airlines and driller proceeding to Darb tomorrow will take it with him. The testing and reporting of results should be accomplished within the next month or two provided we get radio communication.

Regardless of the discovery of large ground water, the wadi flowing through Darb drains the second largest basin in the Tihama-Asir, being exceeded only by the drainage basin of Wadi Baish. Furthermore, the headwaters of the Itwad drainage includes the highest rainfall known to us through the vegetation studies of Dr. John Tothill. These factors were considered when the site was chosen. The rainfall comes largely in the summer months and therefore it seems important to me that the subjugation from surface rainfall be undertaken as soon as possible regardless of the results of test drilling. A large area of land classified as Class I by FAO lies along and northwest of the wadi and even primitive leveling with perhaps only a few spirit level surveying lines might make a very substantial beginning on the project.

As I had earlier pointed out, a dug well in the basement pediment along one of the wadis on the north side of Darb could easily be excavated with a few native laborers if the most favorable campsite is there, or else water could be hauled from one of the three or four good wells along Wadi Itwad in the vicinity of Darb.

GBrown:djh

Water Progra

File 2
Chron.

TECHNICAL COOPERATION ADMINISTRATION
Jidda, Saudi Arabia

June 7, 1953

H.E. Assistant Deputy Finance Minister
Kingdom of Saudi Arabia
Jidda

Your Excellency:

In reply to the request of H.E. Minister of Finance, I have investigated the ground water possibilities in the vicinity of Um Lajj following the aerial photography of the vicinity by Aero Service Corporation. We have chosen drilling sites and instructed the drilling superintendent of Michael Baker Inc. to dispatch a drilling rig to Um Lajj. In the meantime we are preparing a geologic map of the vicinity and analysing water samples collected from wells and springs thereabouts. As soon as the test drilling is completed we shall submit a report and recommendations for delivering water to the town.

The water supply for the town of Wajh can best be obtained by laying a pipeline from Bir Magrona about 10.5 kilometers east of the town. I believe that the possibility of obtaining fresh water by drilling nearer to Wajh is remote indeed. My preliminary survey by altimeter indicates that Bir Magrona has sufficient altitude to supply water to Wajh by gravity flow and the line can be laid along the wadi floor where a ditching machine or hand excavation can rapidly bury the pipe. Accordingly, I would recommend a spirit-level survey from the well to a reservoir site on the limestone bench on the east side of town and the design of a storage reservoir as well as a distribution system in addition to design of the pipeline. I believe sufficient asbestus-cement pipe of proper size is on hand in Jidda so that installation could be made as quickly as the engineering design is made. Maintenance of the water supply can best be done by utilizing a gasoline or diesel engine and driving a horizontal centrifugalpump such as is now in Bir Magrona. A second engine and pump should be stored or installed at the well in order to insure a continuing supply. Repair can then be handled without special deep well equipment. If the well yields insufficient water it could be deepened somewhat by excavation. As the hard crystalline rocks beneath the well derive water from the gravels and unflow of the converging wadis, little would be gained by deep drilling in the vicinity.

Please accept my respects.

/s/ Glen F. Brown

Glen F. Brown

Request for translation and transmission 6/9/53.

TECHNICAL COOPERATION ADMINISTRATION
Jidda, Saudi Arabia

June 7, 1953

MEMORANDUM TO: Mr. John A. Dunaway
Acting U.S. Director TCA

FROM: Glen F. Brown
Chief Natural Resources

RE: Report on Ground Water Possibilities in the Vicinity of Um Lajj and Water Supply for the Town of Wajh.

Attached is a report concerning ground water possibilities in the vicinity of Um Lajj and water supply for the town of Wajh from Bir Magrona about 10.5 kilometers east of Wajh. Kindly transmit to the Liaison Office for translation and transmittal to the Assistant Deputy Finance Minister.

Water
Program

TECHNICAL COOPERATION ADMINISTRATION
Jidda, Saudi Arabia

June 6, 1953

Your Excellency:

Herewith is a report by Mr. Bogue, Geologist, of his trip to the iron-bearing formation northeast of Diba in the company of Mr. Simon Lake, Geologist for the Bethlehem Steel Company.

Mr. Lake talked to me briefly on his return to Jidda. His comments were that large deposits of low-grade iron ore interbedded with chert, the iron oxide and chert occurring in alternating thin beds, were seen. No exposures of shipping-grade ore in sufficient volume were seen, but he thinks that the deposits need detailed study with the hope that bands of ore of high enough grade and sufficiently large for shipping might be found. Mr. Bogue states that on the two trips he has been able to spend only five days on the outcrops.

I believe that aerial photography of the entire region, in connection with Your Excellency's wish for photo coverage throughout Arabia, would permit the most scientific approach to appraising the value of these deposits. The outcrops of iron-bearing formation could then be mapped and its relation to other formations established so that the most favorable areas could be studied in detail. If our plans for the expanded drilling program materialize in line with Your Excellency's wish, I would propose that we work in the Diba region early in the program.

Please accept my respects.

Yours very truly,

Glen F. Brown
USGS - TCA Field Party

Encl - Report

His Excellency,
The Minister of Finance,
Kingdom of Saudi Arabia,
Riyadh.

GFBrown:djh

File 2

TECHNICAL COOPERATION ADMINISTRATION
Jidda, Saudi Arabia

CONFIDENTIAL June 2, 1953

MEMORANDUM

TO: Mr. Glen F. Brown
Chief, Natural Resources Division

FROM: Richard G. Bogue
Geologist, Natural Resources Division

SUBJECT: Trip to Showings of Iron Formation Northeast of Diba, Saudi Arabia

Enclosed please find the report on the trip with Mr. Simon Lake to the showings of iron formation northeast of Diba. Mr. Lake examined the deposits for the Bethlehem Steel Co., Bethlehem, Pa.

Encl - Report (2 copies),
subject above.

CONFIDENTIAL

RGBogue:djh

REPORT ON TRIP TO SHOWINGS OF IRON FORMATION NORTHEAST OF DIBA, SAUDI ARABIA

This trip was made at the request of H. E. Abdullah Sulaiman, Minister of Finance, Kingdom of Saudi Arabia, to interest the Bethlehem Steel Co., Bethlehem, Pennsylvania, U. S. A., in the exploitation of the showings of iron formation previously reported by Bogue (Geologic Reconnaissance in Northwestern Saudi Arabia - April 1953). Mr. Simon Lake, geologist, examined and sampled the showings of iron bearing material in the Wadi Sawawin and Wadi Haris areas located northeast of Diba.

The trip was made with the joint cooperation of the Saudi Arabian Government and the Natural Resources Division of the Technical Cooperation Administration of the United States.

The party of Mr. Lake and myself, accompanied by three drivers, two soldiers and a cook, left Jeddah May 9, 1953 and returned May 22, 1953. Approximately three and one-half days were spent examining the showings of iron formation and the rest of the time was consumed travelling.

Mr. Lake examined the showings of iron formation and took some samples for assay. This was a preliminary examination on Mr. Lake's part to determine if the deposits were worthy of further examination and more detailed work by the Bethlehem Steel Co. He stated that the company was primarily interested in one which was of high enough grade to be shipped directly to the smelter and probably would not be interested in any ore which required milling before shipment.

Mr. Lake could not give a definite or official opinion of the deposit until the samples were assayed and he consulted with the principals of his company. However, he did state that it was unlikely that they would have any further interest in the deposit due to the apparent lack of direct shipping ore.

I accompanied Mr. Lake part of the time in the field during his examination and part of my time was spent making a general reconnaissance of the surrounding area to find additional outcrops of the iron formation and to see if there was any high-grade ore. Two new areas were found where there are large outcrops of the iron formation. One in Wadi Sahlula, which is about 5 miles west of the Wadi Sawawin area, and the other in Wadi Shugri, a few miles south of Wadi Haris. Some of the iron formation in Wadi Sahlula appears to be of better grade than average but all of the other exposures are relatively low grade and high in jasper.

A few narrow bands of high grade ore were found but the conditions are such that they could not be mined separately and the relatively small tonnage in these bands would not warrant setting up a mining operation.

Nothing was seen on this trip which would alter the opinion given in my first report. There is a large tonnage of the iron bearing material but it is of low grade and it would probably be uneconomical to separate the hematite and jasper. The only hope appears to be to find iron ore of mineable grade.

It is believed that this area is worthy of at least additional reconnaissance and more time be spent than I have to date.

Richard G Bogue

Richard G. Bogue
Geologist

Jeddah, Saudi Arabia
May 27, 1953

RGBogue:djh

TECHNICAL COOPERATION ADMINISTRATION
Jidda, Saudi Arabia

June 6, 1953

MEMORANDUM TO: Mr. Sadek Husseini, Director
Liaison Office for Technical Assistance

FROM: Mr. John A. Dunaway, Acting U. S. Director of
Technical Cooperation in Saudi Arabia

RE: Request for Translation and Transmittal of
attached Letter with Report Enclosed to
His Excellency, The Minister of Finance

Will you please arrange for the translation and transmittal of the attached letter with report enclosed to His Excellency, The Minister of Finance.

John A. Dunaway
Acting U. S. Director of
Technical Cooperation in
Saudi Arabia

JADunaway:djh

Natural Resources
water Program.

TECHNICAL COOPERATION ADMINISTRATION
Jidda, Saudi Arabia

June 6, 1953

H. E. Deputy Assistant Finance Minister
Kingdom of Saudi Arabia
Jidda

Your Excellency:

The results of test-drilling at Wadi Daghbaj (Abu Bardi), 17 kilometers northeast of Jidda is as follows:

The pumping test of the well drilled below the old dibble gave a safe yield of 10,300 gallons per day or about 7 gallons a minute. The quantity is insufficient for either a supplemental supply for Jidda or for irrigation.

A sample collected with Sadek bey Husseini in a mishash about 2 kilometers above the drilling site analysed as follows:

	Parts per million
Total Hardness	258 (as $CaCO_3$)
Calcium	74
Magnesium	18
Sodium (plus K)	525
Bicarbonate	193
Chloride	706
Sulphate	236
Total dissolved solids	1752

This water is potable although high in sodium chloride. It is somewhat softer than the Jidda water supply from Wadi Fatima.

An analysis of water collected from the drilled well at the end of the pumping test, as determined by Mr. George Wilson, is as follows:

	Parts per million
Total Hardness	540 (as $CaCO_3$)
Calcium	134
Magnesium	50
Sodium (plus K)	1137
Carbonate	8
Bicarbonate	105
Chloride	1440
Sulphate	852
Total dissolved solids	2926

Mr. Wilson states: "The high percentage of sodium (86% of cations), high chlorides and sulphates and the presence of alkali carbonates make this water unsuitable for irrigation."

H. E. Deputy Assistant Finance Minister

I might add that it is also not suitable for drinking.

I think we are dealing with unusual conditions resulting from the abnormally high rainfall of this past winter and I believe that continued pumping or withdrawal from the dibble will produce increasingly brackish water. We could leave the casing, then in wet winters, a pump could be put on and some land irrigated, but I am afraid that you could never count on any substantial perennial supply of sweet water.

Please accept my respects.

Glen F. Brown

THE FOREIGN SERVICE
OF THE
UNITED STATES OF AMERICA

TECHNICAL COOPERATION ADMINISTRATION
Jidda, Saudi Arabia

June 6, 1953

MEMORANDUM TO: Mr. John A. Dunaway
Acting U.S. Director of TCA

FROM: Glen F. Brown
Chief Natural Resources

RE: Report of test drilling at Wadi Daghbaj (Abu Bardi)

Attached is a report concerning a possible water supply 17 kilometers northeast of Jidda. Kindly transmit to the Liaison Officer for translation and transmittal to the Deputy Assistant Finance Minister.

Glen Brown
Glen F. Brown
Chief Natural Resources

File 1

TECHNICAL COOPERATION ADMINISTRATION
Jidda, Saudi Arabia

June 6, 1953

MEMORANDUM

TO: Mr. Sadek Husseini, Director
Liaison Office for Technical Assistance

FROM: John A. Dunaway, Acting U.S. Director of
Technical Cooperation in Saudi Arabia

RE: Request for Translation and Transmittal of
attached Report

Will you please arrange for the translation and transmittal of the attached Report of Test Drilling at Wadi Daghbaj (Abu Bardi) to His Excellency, The Assistant Deputy Minister of Finance.

John A. Dunaway
Acting U. S. Director of
Technical Cooperation in
Saudi Arabia

JADunaway:o

Attachment -
As above

Water Program.

AIRGRAM

UNCLASSIFIED

AMEMBASSY
Jidda A-84 June 3, 1953 453

TOTEC

Yenbo test well analyses follow: Lab. No. 47656 SiO_2 40, fe dissolved at time of analysis. 11, Mn dissolved at time of analysis .05, Al.2, Ca 270., Mg 6.7, Na 590., K 1.3, Cu .00, HCO_3 100, CO_3 0., SO_4 297, Cl 1130, F 4.5, NO_2 9.9, NO_3 14, PO_4 .1, Dissolved solids (sum) 2420. Hardness as $CACO_3$ 701, Non-carbonate 619., Specific conductance (micromhos at 25°C 4120., PH 7.0, Color 1., Zn .00, As .0, Cr.00, Sb .0, Se .0, Be .00, Id 3.6, B .80.

Re analysis given your cable. For irrigation quality seems satisfactory if used on open well-dranied soils. High concentration total solids would have adverse effect if soils tight and poorly-drained. Soil may need occasional flushing. If water has 1 ≠ ppm boron could adversely affect certain crops. For domestic use two-bed arion-cation exchanger available commercially demineralizing water having up to 3000 ppm. Eg. Report shows at rate 8000 gpd water 2400 ppm TS demineralized to 500 ppm cost including operation and 15 year amortization about $1 per 1,000 gallons. Problems re specific character water and daily rate treated make definite costs estimate hard. Am requesting additional information to send soonest.

DULLES

USGS:TEAkin:TCA/NEADS:JRMock:mf 6-2-53

USGS -Eakin (by phone)
TCA-Young
TCA-Taylor

UNCLASSIFIED

BROWN REQUESTED THIS ANALYSIS BY CABLE #881 (Confidential) 5/23/53.

F-1

F-2 /

CHRON III

CONFIDENTIAL

SecState May 23, 1953

PRITY 881

CONFIDENTIAL

TOTEC.

For W. D. Johnston, USGS from Glen Brown.

Kindly cable results water analysis Yenbo. Also inquire from quality of water how water of following composition could be treated for domestic or irrigation purposes. Sodium 75, Calcium 665, Magnesium 91, Sulphate 1704, Chloride 246, Carbonate 0, Bicarbonate 93, Silica 42, iron and alumina 15, total salts 2930. Cable methods and aproximate costs of treatment.

HARE

JADunaway

GFBrown:o

CONFIDENTIAL

To Fryer
5/26/53

5. Water Development

I am not quite sure of the
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(Ltr. from J.A.Dunaway to E.R.Frye

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There is another angle to thi
One principal objective of Point 4
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the Natural Resources Division.

Confidential

Natural Resources
Water Program.

FROM FRYER LETTER 4/29/53

Before we consider any further underground water use, we must be sure that it is a public service designed to develop water on the desert for the Bedouin.

File 1

Natural Resources.

TECHNICAL COOPERATION ADMINISTRATION
American Embassy
Jidda, Saudi Arabia

April 21, 1953.

Your Excellency:

Mr. George Wilson, water resources engineer, has completed a pumping test on a well completed at Wasili, at a distance of about 17 kilometers east of Gizan and for the city water supply. He reports a large supply present.

I have made an analysis of water from this well with the following results:

	Parts per million
Calcium	109
Magnesium	45
Sodium(plus Potassium)	10
Bicarbonate	276
Chloride	76
Sulphate	140
Total Solids	656

This indicates that the water is of good quality.

Mr. Wilson collected a sample of gas from the well and is forwarding it to Dhahran for analysis. The well pumps some sand as it now stands and we shall have to get a screen designed for the grain size of the sand, which will be ordered immediately. It seems desirable to notify Jaffali Bros. and Mohammed Surur that survey and design of the pipe line and water storage be begun as soon as they wish.

Please accept my respects.

Very truly yours,

Glen F. Brown
Glen F. Brown
Chief, Natural Resources Division

His Excellency,
The Deputy Assistant Minister of Finance,
The Ministry of Finance,
Jidda.

Jav
GFBrown/l
JADunaway

File 1
Natural
Resources

TECHNICAL COOPERATION ADMINISTRATION
American Embassy
Jidda, Saudi Arabia

April 21, 1953

Your Excellency:

A well has been completed for a water supply for pilgrims passing through Rabigh. This well is 6 kilometers east of Rabigh and on the south bank of the Wadi. It will be necessary for the Pilgrimage authority to assign a tank truck here. A report that the well had become salty proved to be false.

We plan to drill in the Rabigh area finding the nearest source of fresh water for the town, but this can be done most advantageously after we have mapped the geology. The well now completed with a pump is an emergency and temporary supply until we can complete exploration.

I would be grateful if Your Excellency would pass on this information to Mohammed Surur.

Please accept my respects.

Very truly yours,

Glen F. Brown
Glen F. Brown
Chief, Natural Resources Division

His Excellency,
The Deputy Assistant Minister of Finance,
The Ministry of Finance,
Jidda.

JAD
GFBrown/l
JADunaway

copies made for TCA, Mr. Ambassador, USGS (Upon approval JAD), Mr. Brown, with 2 extra copies to Mr. Brown.

(Copy) -

INTER-OFFICE MEMORANDUM **MICHAEL BAKER, JR. INC.**

TO Mr. H. E. Lannan DATE April 21, 1953

FROM C. H. Majors SUBJECT Musajid & Rabigh Drilling

The well at Musajid has been drill to 116 feet. A pump, secured from Aramco, is to be installed. To finish this job the following material will be needed. 120 feet of 2" suction pipe and fittings to be placed in the well. 150 feet of 3" discharge pipe and fittings to run the water from the well to a storage tank which is to be placed on a five foot rise to provide a gravity discharge flow. A storage tank of 3000 gallon capacity. A local contractor will construct a 6' x 12' x 6' tank of concrete and stone materials, including a cover, for approximately 3,000 Saudi Riyals. The local power plant operator will take charge of the pump for a small salary.

The well at Rabigh has been placed in operation with a temporary pump. The production of this well, 50 bbl. per day, is not sufficient to warrant the construction of a pipe line to the town, so a tank truck should be provided to transport this supply for emergency use during the Haj. An operator is needed to look after the pump at this location.

Copy to: B. S. Fahoum
Sadek Bey Husseini
Glen F. Brown

9-10-53.
Natural
Resources.

I agree with Ali Bey Shafi'i on the attached report with one exception, namely, I feel that we do not have enough data at the present time to determine beforehand the outcome of the Qusina-Qubeila project.

/s/ F. D. Garretson

TRANSLATION

Preliminary Report on

Water Resources in Wadi Hanifa, Neighboring Wadis and New Water Supplies for Riyadh

1. INTRODUCTION

In accordance with the request of H.E. Shaikh Abdullah Sulaiman, Minister of Finance, I, together with Mr. Jarretson, formerly Chief Engineer for Baker's and now the Director General of Public Works for Shaikh Mohammed Bin Laden, visited Wadi Hanifa, its major tributaries and the neighboring wadis.

H.R.H. the Crown Prince had kindly lent us the services of one of his men to act as our guide. He was of great help to us.

Mr. Jarretson furnished the maps, reports and data written on Wadi Hanifa. The most important was a report titled "Underground Dam for Riyadh" and prepared by Bechtel Company. Mr. Jarretson helped me in the study, approved of the contents of the report and signed it with me.

We encountered the difficulties arising from the low water table. However, we hope that the proposals embodies in this report will be favorably considered and prove useful. We point out that agricultural development should be diverted to the wadi plain that lies to the southeast of Marat and northwest of Darma and to other plains and wadis, as Wadi Hanifa has nearly used up its resources.

Riyadh water supply, however, is now secure from Hayer, in Wadi Hanifa. This project is still under process. If, on the other hand, Hayer water is found to be insufficient, we suggest that water be brought from Oweineh and Jubeileh districts where the water is 90 meters above Riyadh. This source could supply Riyadh with an approximate amount of one to two million gallons of water daily.

We also suggested that pumping machines be operated by electricity. A power station should be built between Darmah and Mazahimia and another in Riyadh. It may, on the other hand, be found advisable to build one station only in Riyadh and combine it with the present electric station. Such a proposal would cut irrigation expenses to one half and would conform with modern technical methods. (See project of North Delta Section in Egypt)

We made some further suggestions for the development of the country and as a future reference.

2. SUBJECTS UNDER DISCUSSION

A. To raise the water table in Wadi Hanifa, which has become very low as a result of the excessive use of pumping machines for agriculture.

B. New water supplies for Riyadh.

C. Water resources in the neighborhood of Wadi Hanifa and recommendations for agricultural development thereto.

3. THE ELEVATION OF THE WATER TABLE IN WADI HANIFA

I read the report in English on "The Underground Dam for Riyadh" written by Bechtel Company. This extensive study was concluded with the recommendation that the building of the underground dam in Wadi Hanifa be postponed until enough data on water hydraulogy of this Wadi is obtained. However, the problem in my opinion, is not the collection of hydraulic data, as water percolates thru the bed of the Wadi, where it is not desired and the seyls carry the water southwards when the intention is to stop its flow in Riyadh, whatever its quantity. The hydraulic data may, on the other hand, be necessary to determine the width of the spillway, but this information has been supplied by "Majed" dam, as this dam has been standing for a period exceeding 100 years, and it withstood several large seyls. A spillway 100 meters long and two meters high will suffice to withstand the largest seyl ever encountered in this wadi. But the problem standing in the way of constructing an underground dam is the distance to the rock level which is 55 meters from the surface and how to fill it. This is the problem that should be solved. The underground dam is of vital importance to Wadi Hanifa, and it reflects on the farsightedness of those that visualized it. Especially that the underground rocks of Wadi Hanifa are of a solid nature and do not break or fracture easily, as could be seen from the exposures behind Majed dam and that such an abundant quantity of fresh water has been conserved. In the drilling of well No. 22B, 22 feet of sand and gravel were encountered, then 65 feet of dry impermeable rock. (See report on underground dam in Riyadh, Pages 13-14 (A) Wells and Trenches)

The solution to this problem is the same as that done by Arab kings in the Wadis of Hijaz, Yemen and Hadramout, i.e. the building of a series of check dams to slow down the flow, enable the wadi to absorb the largest quantity of the water of the seyl, decrease its velocity and prevent the destruction of gardens and their surrounding walls as happened lately in Wadi Layyeh in Taif, when the old check dams crumpled down. To be useful the proposed dam should not be less than five meters in height, to have a storage capacity of one to one and one half million cubic meters approximately. A survey with contours should be made for the wadi and its gardens between the mouth of Wadi Obeir and the underground damsite in order to determine whether to build a dam in the former or latter site or at both sites simultaneously. This survey would also be useful to determine the height of the dam so as to avoid any damage to the gardens if surrounded by earthen walls which will prevent their flooding during the period when the water upstream of the dam is high.

I believe that the soil of the wadi is suitable, if mixed with water and rolled with sheep's foot roller, to build the dam, instead of building it with stones as suggested by Bechtel Company. However, this problem may be decided upon when plans for the construction of the dam are made. The spillway should be built with stones to a length of 100 meters in order to withstand a volume of water two meters high. The top of the dam should as a precautionary measure be one and one half meters above the two meters level.

It is also important to build two irrigation channels on the banks of the dam to enrich the understream gardens of Riyadh with the fertile silt. This will also help in elevating the water table and in washing the salt from the soil.

The irrigation distribution channels should also be marked on the contour maps, if not already marked by Bechtel Company.

4. NEW WATER SUPPLIES FOR RIYADH

The Hayer water will reduce the acute water situation in Riyadh. However, if the demand for water increases with the increase of population in the future, the best source is a strip of Wadi Hanifa which extends from Wadi Hudaidir on the right bank, through Oweina village, for a distance of two kilometers of uncultivated land that has no wells, then downstream from Qabileh, a distance of six kilometers of uncultivated land. It will be quite easy to dig a well at one mile intervals in this strip or a total of eight wells. Such wells should be similar to wells Nos. 46 and 22B which supply Riyadh with water at present. An amount of one million gallons or more could thus be furnished everyday. Initially this water is 90 meters above the Riyadh reservoir and the distance is 45 kilometers. The water will, accordingly, flow to a slope of two meters in every kilometer, thus saving a lot of money from the cost of pipes. This project is similar to that of the new water supply of Mecca and Abdul Aziz water supply of Jeddah.

We also considered the abundant water of Muzahimia and the possibility of bringing it to Riyadh. It is the most suitable source outside of Wadi Hanifa and is on the same level as that of Riyadh. Its water is fresh and it is 50 kilometers distant from Riyadh in a beeline. However, the high mountains of Towaiq stand in its way before it even reaches Wadi Kidaya and the excessive pumping required renders this project of far less importance than that of Qabileh water.

I also examined "Heet" water but found it in a deep cave lower than Riyadh by 170 meters and is about 25 kilometers distant. Furthermore the water is salty and is rendered dirty by the drinking of the cattle. Thus it is not suitable for Riyadh.

On our way to Heet we found a drilling machine drilling a well near the cave, but we believe that the possibility of striking water is remote.

We also encountered Ibrahim Busheimi digging a well on "Aroома" Road, but he reached a depth of 150 meters without striking water. This good spirit, however, implies an encouraging future and I suggest that a geological study be made of these diggings instead of letting such efforts go to waste. I also suggest that a technical survey be made by one of the companies specialized in drilling.

Arooma well is 130 kilometers distant from Riyadh. We did not reach it, but were informed that its fresh but scarce water is 50 meters deep from the surface. It is reckoned that this water is much lower than Riyadh as it is located on the fringe of the desert and beyond the high mountains. The bringing of this water to Riyadh is, therefore, impractical.

5. WATER RESOURCES IN THE NEIGHBORHOOD OF WADI HANIFA AND RECOMMENDATIONS FOR AGRICULTURAL DEVELOPMENT THERETO

A. Agrab Depression

This depression is merely a khabra with an area of 1500 acres. It has six wells with four inch pumps. The water used to be 12 meters deep but has now dropped to 15 meters. We encountered Shaikh Abdul Aziz Ben Yusaf digging a well in the rock to obtain enough water as the water table has gone down after the digging of the six wells. Shaikh Abdul Aziz stated that, if he is sure of the result, he will not stop digging until he strikes water. It is suggested, therefore, that the Government undertake the digging of a well to study this possibility.

B. Nagee'a Springs

These are natural but weak springs located 15 kilometers west of Darma in Khabra El-Hawar. We recommend that a test well be drilled as a possible source of artisan water. A geologist should determine the site of this well so that surer results may be obtained.

C. Cutting Down of the Expenses of Pumping Machines in Riyadh Area

In places where wells abound such as Muzahimia, Darma and Riyadh, we recommend that a power plant be installed. In Mazahimia and Darma areas, for example, there are 400 wells, with a 12 horse power pump to every one, i.e. a total of 5,000 horse power. A power plant as indicated will reduce the expenses to one half at least and will regulate the wash of water resulting from over-pumping.

D. The plain falling between Dhurma, Murat, Birrah and Oueinid.

Drilling activity is going on in this plain, especially northwest of Dhurma and southeast of Murat in the area of Tharmad and Qusur bin Wai'l, where we saw several filled in wells in the wadi and dams with filled in channels. I recommend that one of those dams be repaired to encourage the people to cultivate this vast plain. The notables of Riyadh would do well if they invest their capitals in that area with the view of developing it, rather than concentrating their efforts in Wadi Hanifa until its ground water decreased.

The water in Qusur bin Wai'l is very fresh and abundant, and the water table is 17 fathoms deep.

We have noticed that the water table in Oueinid is quite near the surface. We have also found an abandoned well east of the Mosque, the water table of which does not exceed four meters deep. This well is a bit salty, but with its easiness, agricultural expansion could be achieved in Oueinid if the necessary capital is made available because the people there seem to be poor.

6. OBSERVATIONS AND REMARKS RE WADI HANIFA HELPFUL IN STUDYING ITS PROJECTS

A. Al Majed Dam

This is a model of construction for irrigation with sayls in Nejd, and is characterized with its strength. Its foundations are on solid rock. That is why it resisted the huge sayls for a period of over a hundred years since it was built. One of the reasons that helped its endurance is the width of its spillway, which is 122 meters. A farmer living there told me that the water reaches up to two meters above the spillway at times of a huge sayl. This is what made us look forward with great hopes to the future of this wadi.

The studies of Al Majed dam have helped to design the spillway of the proposed dam. We shall be presenting the designs and specifications of same.

B. The Phenomenon of High Water Table of Ground Water at Qubaila

Our attention has been struck by the abundance of water and its high table at Qubaila in spite of the several water pumps used for irrigation. The water in Qubaila well, from which travellers in Wadi Hanifa drink, is five meters only below the bottom of the wadi. This is due to a depression at Aqrab upstream, the area of which is fifteen hundred acres, where the water of the sayl collects and percolates into the ground. As a result of this, the water table of ground water at Qubaila in Wadi Hanifa elevates. We propose doing this same procedure to elevate Wadi Hanifa water in Riyadh.

C. Ibn Mu'ammar Dam Upstream Oueina

There is a water source at Oueina flowing down the wadi and pouring left of Wadi Hanifa. The village derived its name from that of the source. Ibn Mu'ammar built the dam upstream this tributary wadi. The dam is 270 meters long and is built with stone. It is 9 meters high upstream the wadi and 5½ downstream. We have been told that water gathers at its basin which is 200 acres in area for a period of two months. The water then percolates into the ground, thus increasing the water supply at Oueina. This is a proof of the usefulness of dams.

7. RECOMMENDATIONS

A. Building somewhat low check dams in Wadi Hanifa, starting at the spot near the site of the proposed underground dam or behind Wadi Abir or at both places so that Riyadh and its gardens could make use of them. This does not prevent from building the underground dam at the site where the bottom of the wadi was sounded.

A description of such a dam has already been stated in Paragraph 3 of this report

The water flowing above the spillway of the dam shall be observed during the seyl. Thus we would determine the surplus quantity of water that could be stored by the small proposed dams at the wadi. Then we can construct the one after the other along the wadi, preferring the places where the water table is low such as Dariya.

The rainfall shall be recorded at the basin of Wadi Hanifa in Riyadh, Qabileh, Ammariyh, and Wadi Kudaya (Wadi El-Leban) as has been mentioned before. Comparing the rainfall with the perculation of water, we would be able to regulate the amount of water that could be safely drawn from the seyl of Wadi Hanifa.

B. Supplying Riyadh with fresh water from Wadi Hanifa through pipes from Oweina and Qabileh. This project comes next to the project of bringing water from Hayir if it is found that Riyadh needs more water. This project is characterized with its low expenses and the freshness of the water. It would be unnecessary to spend large sums of money to lift up the water. It resembles the project of Mecca water supply and its water is preferable to other waters.

C. Increasing the capacity of the Riyadh power station to furnish Riyadh gardens cheaply with power to operate the irrigation water pumps, and to furnish Al Hayir station with power to pump the water 150 meters to Riyadh. The irrigating pumps used at present could be sold to the faraway districts. With this method it would be possible to control irrigation water. Furthermore, it would be cheaper.

D. Establishing a power station between Darma and Muzahimia. There are 400 irrigation pumps with a total of 5,000 HP. This project would reduce the cost of irrigation and save the cost of purchasing this large number of pumps and supervising and maintaining them. It might be preferable to join this station with the Riyadh power station into one.

E. Building dams in Wadi Nakhl. This wadi falls southeast of Murat and in it there are old demolished dams in the area of Tharmad and Quam bin Wail. To repair these dams would bring back life again to this area, for there are abandoned walls now.

F. Drilling a test well at Agrab so as to reach water layers below the layers that are used now to draw water from, in order to help the farmers there.

Riyadh, 26 Rajab, 1372 (10 April 1953)

TECHNICAL COOPERATION ADMINISTRATION
Jidda, Saudi Arabia

April 6, 1953

H.E. Deputy Assistant Finance Minister
Kingdom of Saudi Arabia
Jidda

Your Excellency:

H.E. the Finance Minister has on several occasions very kindly accorded me the privilege of discussing with him the need for and the means of obtaining records of surface run-off of water, to the end that this vital resource may be used to the best advantage of all persons living in Saudi Arabia.

H.E. may also remember that a gaging station, to obtain records of flow of water, has been approved for Wadi Hanifa and for Wadi Gizan. This is not to call attention to the fact that neither one has been started, but rather to inform H.E. that a new device has just been produced in the United States which may be of much value in the studies which must be made before full utilization of the water resources can be made. I am today writing for additional information about this device (called a HydRobot) to determine the extent of its usefulness. I would not, at this time, be able to say that this device could completely replace a standard type gaging station. It seems certain, however, that it would cost less and would be much easier to install. Inshallah it might be possible to obtain some of these devices and get them installed in time to measure the water in wadis which might flow in the next 3 to 4 months. This would depend on how quickly the order could be placed and on how quickly the devices could be delivered, if the information being requested indicates they can be expected to obtain the necessary information.

Under the circumstances given above I would respectfully suggest that nothing further be done about actual construction until a decision can be made as to the usefulness of the hydrobot. Also it would seem that no additional studies of surface flow need be made in Wadi Hanifa until more information is obtained as to just how the hydrobot can be used. It will then be possible to make the studies with its use in mind.

In the meantime I can use the time to advantage to make additional studies on the wadis in the Asir-Tihama and should be returned from there by the time the information is received.

I would respectfully make one additional suggestion, that the Saudi Arab Government might wish to consider purchasing the hydrobot directly from the manufacturer in the interest of faster delivery and earlier installation. Possibly the funds which were to be used in constructing the standard type gaging station could be used for installing these devices instead. Considered in this light it is quite likely, as suggested above, that an actual saving could be effected.

I trust this finds His Excellency in good health.

Please accept my respects.

DFD

Donald F. Dougherty

Hydraulic Engineer
USGS - TCA

GHB. JAO

File 1
Natural
Resources

TECHNICAL COOPERATION ADMINISTRATION
Jidda, Saudi Arabia

April 7, 1953

MEMORANDUM TO: Mr. Sadek Husseini, Director
Liaison Office for Technical Assistance

FROM: Mr. John A. Dunaway, Acting U. S. Director of
Technical Cooperation in Saudi Arabia

RE: Request for Translation and Transmittal of
attached Letter to His Excellency Deputy
Assistant Finance Minister

It would be appreciated if you would arrange for the translation and transmittal of the attached letter to His Excellency Deputy Assistant Finance Minister.

John A. Dunaway
Acting U. S. Director of
Technical Cooperation in
Saudi Arabia

JADunaway:o

Attachment -
As above

CONFIDENTIAL

Water

copy in mineral

FOR JOHN DUNAWAY

On the evening of March 14, 1953, I went on an appointment to the office of Suleiman Hamad, Deputy Minister of Finance, and Abdul Aziz bin Abdullah Suleiman, Assistant Deputy of Finance, where we discussed the results of my trip to Dhahran in connection with the proposed expanded ground water development program. I explained that Aramco had made available all their information and that I had several sessions with people in Exploration as well as with Mr. Oliger, Mr. Barger and Mr. Cipher in the Relations Department. I said that I would like to have a few days to prepare a report based on these discussions. I was then asked about Mr. Bogue's trip with Mr. Philby and was read a letter from the Minister of Finance in which he requested a detailed report of the geologic findings during the 66 day trip with Mr. Philby. He asked specifically for the findings on the quantities of the deposit, the analysis of the samples collected and brought to Jidda and especially stressed the vital importance of the possible iron deposits and what we should do as soon as possible to assist in their development. I was then shown an analysis of the samples given to the Mines Department by Mr. Philby in which showed 59% iron and one and a fraction ounces of silver. I expressed the opinion that the quantity of silica was important and that we were sending samples to the United States for determination both of the iron and of the silica. I then expressed the opinion that in view of the favorable quantity of iron in the preliminary analysis that it would be desirable for Mr. Bogue and myself to fly over the area in a C-47 from the Saudi Airlines in order to get some idea of their extent and also in order to mark out the area on the map so that Aero Service Corporation could take aerial photographs and then we would plan to return on the ground and make a somewhat detailed geologic map showing the volume of ore. Suleiman Hamad expressed his agreement to such a program and said that he would send a cable immediately to the Finance Minister requesting that a C-47 be made available and we should stand by to fly up as soon as possible. We then briefly discussed the extent of aerial photography and the difficulty Aero Service were having of cloudy weather. They had consumed about 20,000 gallons of gas, and need an additional supply. Suleiman Hamad then reminded me of his request for a drilling site somewhere in the vicinity of Jidda to be used by a French drilling company to demonstrate a rig they have brought to Jidda in an attempt to interest the Saudi Government. We then briefly discussed the status of the drilling program and I informed him of the presence of some gas in a well drilled for the city water supply at Gizan, adding that a sample would be collected and sent to Dhahran for analysis. I told HE that we were concerned about the way the drilling program was slowing down to which he replied that he would be very happy to have any suggestions I would care to make regarding what is needed to expedite the program.

One point in the discussion regarding the ore reserves HE expressed the desire of the Saudi Government to try to interest American companies in the ore if it is sufficiently attractive enough. I replied that the published reports of the Geological Survey are received by all of the mining companies and is one of the best ways to interest American companies in concessions through the medium of Geological Survey Publications. However, I added that our job here is to try to make the Saudi Government strong and economically sufficient and that we are of course very happy to help them interest American mining companies in any substantial ore deposits that they may have.

Glenn Brown

CONFIDENTIAL

CONFIDENTIAL SECURITY INFORMATION

2.24

natural resources.

Report of a meeting with Mohammed Surur

On February 24, I was called to the residence of Mohammed Surur, Advisor to the Ministry of Finance, with Sadek Bey Houseini, TCA liaison officer, to discuss the municipal water supply of Gizan.

After exchanging amenities, we discussed the movement of a drilling rig to Musaijid in accordance with Sheikh Sulaiman Hamadh's request in an attempt to find a drinking water supply for the coming pilgrimage. Musaijid is some 80 kilometers southwest of Medina on the Medina-Jidda road. After a discussion of the geologic and hydrologic factors involved H. E. offered to dispatch a truck from Jidda with the necessary casing in order to complete drilling as soon as possible. H. E. Mohammed Surur is Director of the Pilgrimage Authority.

We then discussed the Gizan water supply. H.E. reviewed the history of the current development, saying that an agreement had been reached whereby SAG would furnish half the capital outlay, and a local water company the other half. Now the water main has been shipped to Gizan, and Juffali Brothers were ready to install it as soon as we could give them the location of the source.

I showed His Excellency the mosaics of the Tihama al Yemen in the vicinity of the town and described the geology as we understood it. I explained the current status of the drilling program, that a rig was now drilling at the most satisfactory site, the driller having instructions to develop the shallow water and that the rotary rig now testing the Darb area would then make a deeper test at the same site, hoping that we could develop 2 aquifers from one pumping station.

The proper installation now awaits early completion of the test holes.

I then expressed my wish that the Saudi Arabian Government would give early consideration to building a road to Gizan and that it would be extended to Abha and back to Taif along the crest of the Asir. His Excellency replied that in his opinion such development would hinge somewhat on the amount of successful agricultural work accomplished in the Tihama al Yemen.

Glen Brown.

CONFIDENTIAL SECURITY INFORMATION

CONFIDENTIAL SECURITY INFORMATION

Natural Resources

File D

2.17

Memorandum of a meeting with Sulaiman Hamad,
Deputy Assistant Finance Minister

On February 17, 1953, I was called to the office of the deputy finance minister, Sheikh Sulaiman Hamad, to discuss a plan given to His Excellency the Finance Minister by His Royal Highness Prince Saudi, regarding an expanded water development program throughout Saudi Arabia in order to begin settlement of the Bedu on a large scale. The scheme was outlined to me by Shaikh Sulaiman Hamad, reading from a letter from the Finance Minister. They envisage 20 additional drilling rigs to be ordered with a suitable supply of casing and deep well pumps. It was suggested in the letter that the country be studied in quadrants and rigs assigned to each but that the scale and disposition of the drilling should be done on mapping and geological work by the Geological Survey. As a first step they proposed that Aero-Service fly the remaining unphotographed portion of western Saudi Arabia now while in Jidda, the film remaining in the possession of the Saudi Government if they can make adequate moisture-proof vaults (I suggested they be left in bond with U. S. Geological Survey or Aero-Service). There remains something between 250,000 and 300,000 square miles. Their wish is that I prepare a program, including a plan for contracting the drilling and that I should get all the information wherever necessary, including Aramco, Iraq, Iran, Indian

While discussing the scheme with them I expressed myself that considerable thought was required including such problems as an expansion of our present personnel, the submission of the work to other companies (they suggested Army Air Force and Aramco as second and third choices, but I pointed out that it was better to handle it commercially and that Aramco would probably hire Aero-Service if asked to do the job).

I asked their desire for contractors and suggested that in view of the Baker president's visit currently with the Finance Minister that they discuss it. This suggestion did not meet their approval.

Glen Brown

CONFIDENTIAL SECURITY INFORMATION

File
D
Natl Resources

16 February 1953

His Excellency The Minister of Finance
Kingdom of Saudi Arabia

Your Excellency:

We have now discovered sufficient water of potable quality at a distance of about twenty-five or thirty kilometers from Yenbo. More than one well will be required in order to insure a constant supply and also to best develop the water. The relief wells are now being drilled. An engineering survey should be made for a collecting system, storage, and distribution in Yenbo.

The Aero Service Corporation are now trying to photograph the geology of the Musaijid area; and, as soon as flying weather permits them to obtain necessary aerial photographs, I shall visit Musaijid together with the driller and choose a site for a well for pilgrimage water supply.

Please accept my respects.

Glen F Brown
Glen F. Brown

Copy to John Dunaway.

Natural Resources

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f-2
chron
1-Sinclair

UNITED STATES OF AMERICA
TECHNICAL COOPERATION ADMINISTRATION

Jidda, Saudi Arabia
February 8, 1953

MEMORANDUM TO: Mr. John A. Dunaway
Acting U. S. Director of Technical
Cooperation in Saudi Arabia

FROM: E. F. Sinclair, Chief
Transportation and Communications Division

RE: Field Trip Notes: Sail Kabir Water Waste

In travelling through the territory between Sail Kabir and a point near Mecca, it is quite apparent that considerable water from rains must be wasted.

I feel that this might be an ideal spot for a check dam or reservoir which would take this rain water from the mountain and hold it for future use in the immediate vicinity for agricultural purposes, etc., and no doubt some of it could be piped to Mecca as a part of its water supply.

There are, no doubt, other similar locations where check dams or reservoirs could be used in a similar manner.

Natural Resources

TO: Mr. John Dunaway, Acting Country Director, TCA

FROM: Glen F. Brown, Chief, Division of Natural Resources

RE: Possible Development Projects in Saudi Arabia

Water development program aimed at two objectives:

1) Begin settling the Beduin by installation of wells for livestock and
2) Begin land subjugation where sufficient water is found.

Most basic need is aerial photography and preparation of maps to guide drilling program for remainder of Saudi Arabia not photographed (250,000 square miles in northwestern part, exclusive of Rub al Khali and Great Nefud). Besides primary use for finding water aerial photography will have immediate use in Border Survey between Saudi Arabia and Jordan, in mapping iron formations and other mineral deposits, especially those having a bearing on proposed railroad extension, soils, and agricultural development, in location of air fields, and in flood control design. As a matter of fact, it is basic to anything attempted in this country. The photographic job could be finished in two or perhaps three years (or the most vital portion in one year) and would have lasting benefits on economy of Saudi Arabia. Cost of photography and map compilation about two million dollars. Technicians and necessary scientific equipment to use photography will cost an additional $600,000 per year. Expanded drilling program as planned will cost Saudis an estimated three million dollars per year exclusive of warehouses, maintenance shops, etc. Besides prime objective for nomads it will be basis of water supplies for all remaining towns in the country, for which no water source has been worked out.

This kind of work yields positive and concrete results and has already been tested. Nucleus of work started is now endangered by lack of vision and incompetence in TCA and State Department.

Smaller, more localized development projects.

1) Road from Jidda to Gizan of prime importance for agricultural development of Saudi Arabia. Mapping now nearly complete enough to locate this road for access to farming communities and coastal towns, and for future agricultural developments.

2) Fifteen-meter dam (height) at Abha, capital of Asir, for extending irrigation season; about $500,000. This could be a fine demonstration job. Probably the only place in Arabia where surface storage is feasible.

3) Steroplanigraph contour maps for road location from Darb to Abha for an engineering estimate of construction cost; about $25,000. This could be extended from Abha to Taif, thereby completing roads to nearly all important settlements in western Arabia.

4) Water mains to Red Sea ports. SAG have most of pipe for water lines for water supplies for Wejd, Um Lajj, Yenbo, and Qunfida along the Red Sea. Drilling is far enough along that engineering company could make pipe line

surveys, so that contractor utilizing ditching machines and small mechanized crews could lay pipe lines and build storage reservoirs for these towns; all these towns now get water via camel and donkey train, in one or two cases with an antiquated truck. Work of USGS so far has found a water source for all of them and pipe-line installation would have a vast effect on entire economy of Western Arabia. Cost $500,000 or less depending on competence of contractor.

File
D
Natural Resources

Jidda, Saudi Arabia
January 14, 1953

MEMORANDUM

TO: Mr. Thomas Smallwood
Chief, FAO Mission to Saudi Arabia

From: Glen F. Brown
Chief, Natural Resources Division - TCA

RE: History of current well drilling program in western Saudi Arabia

The U. S. Geological Survey Mission to Saudi Arabia began active field work in November 1950. At that time it was agreed that a drilling program should logically follow, and in the spring of 1951 H.E. the Finance Minister requested Department of Agriculture to buy 4 churn drills and 1 rotary. Nine months later, at the end of 1951, it was discovered that the rigs had not been ordered. The Survey group then ordered the drills through Michael Baker, Inc., on Najib bey Salha's approval and delivery of the churn rigs was made in the early summer months of 1952. The rotary rig was delivered in the fall. In the meantime drilling was started in Wadi Fatima and Yenbo, at the Saudi Government insistence, before adequate geological field work was done. In May 1952 the Finance Minister asked Baker to take on the responsibility of a country-wide drilling program, channeling request through the USGS Group for geological control. A churn drill was sent to Qizan in July and was able to put down 3 test holes without trucks which were ordered in June but had not yet been delivered in January 1953. By hiring trucks locally at exorbitant prices it has been possible to keep the drills operating, at least part of the time, and a beginning was made for the FAO Qizan project.

Radios for communication from Jidda to the drillers are reported to be en route from the United States, and it is believed that a comprehensive and continuing drilling program will begin on arrival of the trucks. The Finance Minister has approved and construction has started for a water resources compound in Jidda. Parts will be stocked and a machine shop, tool dressing, and repair plant maintained so that the drilling program should go on without delay.

UNITED STATES OF AMERICA
TECHNICAL COOPERATION ADMINISTRATION

Jidda, Saudi Arabia

MEMORANDUM

January 14, 1953.

TO: Mr. E. Reeseman Fryer

FROM: Mr. John A. Dunaway

RE: Annex B Long Term Programs

We are enclosing four copies of the Long Term Program Reports for the several Divisions which have been prepared by the respective Chiefs. To date, no Long Term Program has been submitted by the Education Division.

The Reports have been reviewed by Ambassador Hare and in general meet with his approval.

Annex A, the Long Term Over-All Program Report is in preparation and will be sent to Washington following review and approval by the Ambassador.

Natural Res

UNITED STATES OF AMERICA
TECHNICAL COOPERATION ADMINISTRATION
Jidda, Saudi Arabia
December 21, 1952

LONG TERM COUNTRY PROGRAM
SAUDI ARABIA
NATURAL RESOURCES

Annex B Code 400

I. Problem in Field of Activity

The nature and extent of the problem: Concerns water, both surface and ground, its development and conservation; the exploration and development of metallic and non-metallic mineral depots; the accurate charting for relation of natural resources to roads, railroads, coastal areas, air fields, agricultural lands, etc. The problems are as broad as the land and as deep as the drill. The entire population is affected. Probably no general economic development can be accomplished without consideration of natural resources and particularly that of water.

II. Existing Governmental and Other Programs

The Arabian American Oil Company has developed the natural resources of Eastern Saudi Arabia, with spectacular results.

The Saudi Arabian Government has a department of mines located in Jidda which is currently developing a small gold property in the Nejd. There is no systematic or scientific search or study of natural resources other than those of Aramco.

The country has a drilling program carried out by an American contractor and under the technical direction of the Natural Resources Division of the Point Four Program. The Saudi Government spent $1,093,300 on this program during the past year. Plans include an expenditure of this magnitude during the coming year.

The Food and Agricultural Organization of the United Nations has begun an agricultural development in the Tihama al Asir for which the Natural Resources Field Group has contributed the basic mapping and water exploration work. The budget on this work may exceed one million dollars during the next year.

III. Means of Resolution

Problems that can be corrected by:

A. Country itself can supply young technicians to map geology, carry on stream gaging and ground water program, help in basic map work, test drilling, pumping tests, sampling of deposits, etc. It can and should finance the bulk of the cost.

B. TCA should carry on basic map work, including aerial photography, geologic and geographic maps for other work in the country, direct an

exploration/

RESTRICTED

exploration drilling program and help start a production well program. They should cooperate closely with Saudi Arabian Government Ministry of Finance in particular the Department of Mines, Aramco, FAO.

IV. Objectives for Point Four Action

Develop all available water supplies without exceeding safe yield. Map and advise on development of all deposits and indicate areas worth intensive prospecting. Prepare adequate base maps for planning roads, railroads, agricultural developments, water pipelines, storage dams, airfields, harbors, etc.

V. Resources Required for Point Four Program

A. Finance - budget of $252,000 per year, plus whatever is needed for aerial photography, also suggest SAG finance dam construction, well and quarry installation, gaging stations and observation wells.

B. Personnel needed - Five geologists, draftsman, clerk-stenographer, file clerk, chemist, junior geologist, surveyors, etc.

C. Equipment - Field equipment for each geologist or engineer, trucks, jeeps, radio communication, surveying instruments.

VI. Project by Phases of Work

A. Exploration program.

B. Followed by development program with considerable overlap onto the exploration. Suggest development program be scaled to increase by 10 million dollars each year for next few years.

Glen F. Brown
Chief, Natural Resources
Division

UNITED STATES OF AMERICA
Technical Cooperation Administration

Jidda, Saudi Arabia

December 22, 1952

H. E. Minister of Finance
Kingdom of Saudi Arabia
Jidda

Your Excellency:

Recently it has come to my attention that consideration is being given to the construction of a power line from Riyadh to Hayyir in order to pump the city water supply with electricity generated at the Riyadh power plant.

I would like to point out to Your Excellency the desirability of the city water supply having a separate and independent source of power with electricity generated at Hayyir in a plant of sufficient stand-by capacity to insure continuous operation of the pumps. The problem of fuel for such a plant at Hayyir is very similar to that of fuel for the Riyadh power plant, in that it must be offloaded from the railroad and stored near the generators.

If a common plant is used then in the event of a power failure the city would be without lights and water. Your Excellency doubtless realizes that the citizens of Riyadh might continue a nearly normal life without electric lights but probably could not continue long without water. I visualize the Hayyir water source becoming more important as additional wells are drilled and as water levels decline at Riyadh. Undoubtedly too, there will be an increased load on the Riyadh power system as the city becomes electrified.

Please accept my respects.

Glen F. Brown
Chief, Natuaral Resources

UNITED STATES OF AMERICA
Technical Cooperation Administration

Jidda, Saudi Arabia

December 22, 1952

Country Director
T. C. A.
Jidda

Dear Sir:

Herewith is a letter to H. E. Minister of Finance on the desirability of having a separate power plant for Hayyir to be used for pumping the water supply to the city of Riyadh. Would you please send it to the Liaison Office for translation and submittal.

Very truly yours,

Glen Brown
Glen F. Brown
Chief, Natural Resources

File 1
Natural Res

UNITED STATES OF AMERICA
TECHNICAL COOPERATION ADMINISTRATION

Jidda, Saudi Arabia

December 22, 1952.

MEMORANDUM TO: Sadek Bey Husseini, Director,
Liaison Office, Technical Assistance.

FROM: John A. Dunaway, Acting U. S. Director
of Technical Cooperation in Saudi Arabia.

RE: Request for Translation and Transmittal of
Letter to His Excellency, Shaikh Abdullah
Sulaiman from Glen F. Brown, dtd Dec.22.

It would be appreciated if you would arrange for the translation and transmittal of the attached letter to His Excellency, Shaikh Abdullah Sulaiman, from Glen F. Brown, Chief, Natural Resources Division, TCA.

This letter concerns the desirability of having a separate power plant for Hayyir to be used for pumping the water supply to the city of Riyadh.

File
Natural Resources

Jidda, Saudi Arabia

December 20, 1952.

MEMORANDUM TO: Sadek Bey Husseini, Director,
Liaison Office, Technical Assistance

FROM: Mr. John A. Dunaway, Acting U. S. Director of
Technical Cooperation in Saudi Arabia

RE: Request for Translation and Transmittal of Letter
from Glen F. Brown, dated December 20, 1952, to
Finance Minister re Construction of Gage Houses.

It would be appreciated if you would arrange for the translation and transmittal of the attached letter to His Excellency, Shaikh Abdullah Sulaiman.

This letter from Glen F. Brown, Chief, Natural Resources Division, TCA, concerns the construction of gage houses in Wadis Gizan, Baish, Itwad, and possibly Hali and Yiba.

cc: Glen F. Brown

UNITED STATES OF AMERICA
Technical Cooperation Administration

Jidda, Saudi Arabia

December 20, 1952

H. E. Finance Minister
Kingdom of Saudi Arabia
Jidda

Your Excellency:

Now that Mr. Dougherty, the hydraulic engineer from the U. S. Geological Survey, is beginning to complete his work in Saudi Arabia it is imperative that shelters be built to protect the gaging instruments on Wadis Gizan, Baish, Itwad, and possibly Hali and Yiba. Mr. Dougherty has completed the design for the Gizan installation and plans to return to Wadis Baish, Itwad, etc. within a few days.

At that time it would be highly desirable for a foreman to go along to supervise construction of the shelters. I understand from Mr. Noble of Michael Baker Inc. that they have such a man available and therefore I would appreciate your issuing a work order to them.

Mr. Dougherty estimates that the construction of the gage house for Wadi Gizan would require approximately 25 cu. yards of concrete and 1 ton of reinforcing steel plus necessary lumber for 2 doors and 1 recorder shelf and floor, 30 feet of 2½" pipe for intakes, and hardware for doors. About 500 board feet of 2" x 8" lumber and 350 board feet of 1" x 6" lumber will be needed for concrete forms. This will provide for 2 complete sets of forms which can be used alternately on successive sections of the house and also on other gage houses, with proper care. A cableway will also be required for measuring the flow of water. This is not completely designed but sufficient data is at hand for the following construction which will need to go in, in any case, before the cableway itself is installed:

Footings for A-frames -- Concrete 7 cu. yards
Anchor bolts, 16 @ 3/4" by 2'6" long
A-frames -- 2 @ 1300 pounds each (steel)
Anchorage for cable (2 required)
Concrete - 45 cu. yards.
Steel reinforcement - 700 pounds.

It is estimated that a crew of 12 to 15 men (depending on available equipment) could build the recorder house in 3 weeks and that an additional 2 weeks would be required for the cableway footings and anchorages. One foreman could supervise the entire project.

Please accept my respects.

Glen F. Brown

Dr. Stith

MICHAEL BAKER, JR. INC.
THE BAKER ENGINEERS

BAKER ENGINEERS
WE TRAVERSE THE EARTH

CONSULTING ENGINEERS - CONSTRUCTORS
CABLE ADDRESS : **MIBAKER**

PUBLIC WORKS DIVISION
JEDDAH
SAUDIA ARABIA

November 22, 1952

Mr. Edward Betzig
Acting U. S. Country Director
Technical Cooperation Administration
Jeddah, Saudi Arabia

Dear Mr. Betzig:

I am returning herewith, as requested, your file copy of Mr. Donald Dougherty's report on the water supply of Riyadh. Upon the completion of my phase of this project I will submit a report to Dr. Brown for further action as indicated in your basic letter.

Yours sincerely,

George R. Wilson

GRW/a

George R. Wilson
Water Resources Specialist
Michael Baker Jr., Inc.

HOME OFFICE
ROCHESTER, PENNSYLVANIA

19 Nov. 1952.

Ed Betzig:

Don Dougherty gave you a report on Wadi Hanifa for transmittal to the F.M. This report should not be translated now and transmitted to SAG. A copy should be sent to Riyadh - To George Wilson, Baker Company, who is doing the quantitative ground water underflow and coring on the dam site. They will then submit a joint report covering the physic facts bearing on the feasibility of the check dams This is very important & I would appreciat your taking care of it.

Glen Brown

~~Natural Resources~~
Natural Resources

Jidda, Saudi Arabia
November 19, 1952

Mr. George Wilson
Michael Baker Company
Riyadh, Saudi Arabia

Dear Mr. Wilson:

Enclosed is a report on the water supply of Riyadh by Mr. Dougherty. He has requested that I send this to you prior to submission to the Minister of Finance so that it may be submitted together with your report.

As this copy is required for our files, it is requested that you return it when finished.

Sincerely yours,

Edward Detzig
Acting U.S. Country Director

Enclosure

Jidda, Saudi Arabia
November 18, 1952

H. E. Minister of Finance
Kingdom of Saudi Arabia
Jidda

Your Excellency:

I have the honor to transmit a report on the water supply of Riyadh with special reference to check dams in Wadi Hanifa.

Please accept my respects.

Donald F. Dougherty

THE WATER SUPPLY OF RIYADH, SAUDI ARABIA

Several previous reports on the water supply of Riyadh have been made.

One by the Arabian American Oil Company dated 26 September 1948 covered the ground water hydrology of the area and suggested a means of reducing downstream seepage losses by a series of underground dams.

Another by Glen F. Brown, geologist of the United States Geological Survey, dated 10 December 1951 recommended an engineering study for ground water dams in Wadi Hanifa.

A third (and the latest) study was made by A. E. Niederhoff, water resources specialist of International Bechtel, Inc. In this report it was recommended that the subsurface dams not be built at this time but that instead two check dams be built to salvage surface runoff in Wadi Hanifa and return it to underground storage where it would be available to wells.

This present report is made on the basis of additional field studies made jointly by George Wilson of Michael Baker, Jr. Inc. and the writer during the period 27 October to 6 November, 1952 inclusive and covers only the hydraulic aspects with some additional notes on the probable effects of sedimentation. It is done at the request of H.E. Minister of Finance in accordance with the wishes of H.R.H. Crown Prince Saud.

Opinions given are those of the writer based on data obtained in this field study and on previous reports. This report is subject to review by the Director, United States Geological Survey.

Sedimentation

As the problem of sedimentation affects both sites that have been proposed for check dams, or in fact, any alternate site which might be selected, it is discussed first. As mentioned in the Niederhoff report sedimentation rates are very high. Although data obtained in this survey indicate that rates of sedimentation may be somewhat less than the two feet per year reported previously they are at least in excess of one foot per year, probably about one and one-half feet per year. This is still a rate which would severly limit the useful life of any impounding structure even though the impounding is to be of a temporary nature to induce infiltration into the deep gravel of the old channel. There still must be sufficient storage capacity to hold the total flow of any one sayl. Even more serious is the effect of the sedimentation on the infiltration rate above the structure. With the type of structure proposed, a loose rock fill, it could reasonably be expected that sediment would be deposited over the entire area covered by the impounded water. Therefore infiltration would be reduced immediately after the first sayl to be impounded. Without careful and detailed studies of infiltration capacities of this material it cannot be stated definitely just how much this reduction would be, but it seems fairly certain that within two or three years infiltration would be negligible. The useful life of the structure would therefore be not more than two or three years at the most. The type of structure proposed as a check dam in a previous report cannot be recommended.

Runoff

As runoff characteristics are different for each of the two sites previously recommended for check dams, they will be discussed separately.

1. Qaddiyah - One of the sites propsed is in Wadi Qaddiyah just above its mouth. No very definite information could be obtained on this wadi. There is, however, a small dam 0.8 kilometers above the proposed check dam site. It was built to divert the surface flow into a garden on the right (south) side of the wadi. From local residents it was learned that the diversion dam was built four years ago. The dam is now completely silted to the crest of the dam (about four feet high) and water is now bypassing both abutments. Sufficient data could not be obtained to make even a fair computation of flow but indications are that there could not have been more than a few hundred cubic feet per second of flow at any time during the past four years. This data does not warrant building a check dam at this site at the present time. It is advisable to continue to collect data for this site for future use. The apparently low runoff is discussed somewhat more fully in the "General" section.

2. Hanifa below Wadi Ubair - This is the second of the two proposed sites. It is in Wadi Hanifa about one mile below Wadi Ubair. A low diversion dam was found at the mouth of Wadi Ammariyah which is four to six years old. It is about six and one-half feet high and is completely filled with silt. From local residents it was learned that only one large sayl has occurred since the dam was built, but smaller ones have occurred each year. They were also of the opinion that a somewhat larger sayl had occurred prior to the time this dam was built but within the past ten or twelve years. A preliminary computation of the flow over the dam indicates a peak discharge of approximately 1200 cubic feet per second. Other flows of smaller magnitude may be expected at least once each year. As the shape of a discharge hydrograph for this channel has never been determined it is not possible to do more than estimate what the total flow in this sayl would be, but it is believed it would be not more than 350 cubic feet per second for one day or about 700 acre-feet. On a direct drainage area ratio (probably high) this would be equivalent to 2350 acre feet at the dam site. Since this could be expected only once every five years it is doubtful that a check dam can be economically justified on the basis of data presently available.

General

It sould be pointed out that any structure, in order to effectively induce infiltration of any considerable proportion of the surface runoff should have a storage capacity equal to or nearly equal to the total flow to be expected, if the infiltration is to be induced within the impounded area. This storage capacity must remain throughout the useful life of the dam.

In arriving at infiltration capacity only that portion of the wadi channel composed of sand and gravel can be considered. In most places this section is about 125 to 150 feet wide. That part of the channel with a deep cover of loess, silt or other very fine materials will be practically impermeable.

It is possible that most of the peak discharges can be salvaged by a structure which will permit flow through it but which controls the flow so that velocity can be regulated to that value which will permit infiltration in the channel downstream from the dam. This theory appears to be supported by the large difference in flows on Wadi Qadiyah and Wadi Ammariyah, a difference which is disproportionate to the difference in drainage areas. It will be noted from a study of the drainage area that most of the flow in Qaddiyah (112 sq. miles) is contributed in the upper third of its length whereas that in Ammariyah (174 sq. mi.) is contributed very nearly equally throughout its length. It is just possible that a larger proportion of the flow in Wadi Qaddiyah is already finding its way into the gravel in its traverse of the lower two thirds of the channel. Sufficient data are not available at present, but it would seem that this possibility has sufficient merit to warrant accumulation of additional data on future sayls.

No other sites were considered except to the extent that the two already proposed appeared to be the most suitable from a topographic study, and data on hydraulics and sedimentation would apply with equal force to any other site.

Donald F. Dougherty

Natural Resou

Jidda, Saudi Arabia
November 18, 1952

His Excellency Shaikh Abdullah Sulaiman
Minister of Finance
Kingdom of Saudi Arabia

Your Excellency:

To confirm our conversation regarding the water supply at Al Kharj.

The water beneath the Bijadea along the southern edge in the vicinity of the farm headquarters is too salty for satisfactory irrigation, whereas the water north and east of Yamama at the Al Kharj railroad station and at the military base a short distance east of the railroad station is of good quality as determined by Aramco's exploration department. This water could be used for drinking purposes for the base and for the farm whereas Ain Thulaima is a source nearer to the town of Al Kharj. Therefore the plan as discussed by you with Dr. Brankamp, Mr. Hudson and Mr. Wilson is the most economical, that is, to construct a pipeline from Thulaima for the town, provided sufficient water is found at Thulaima by test drilling, with a different line from north of Bijadea to the farm.

On my brief visit to Al Kharj, I measured the water level in Ein Dhila while three pumps were operating. The water level is essentially the same as it was seven years ago when three pumps were in operation. However, because of the large loss from the long ditch, it is, indeed, more economical to pump water from wells in the Bijadea, as Your Excellency has suggested. The problem involved in installing irrigation wells there concerns the relation of the brackish water on the south side with the fresh water on the north. This has been discussed with Mr. Wilson and the general location of the first test wells chosen. The precise locations will be made in consultation with Mr. Brookshire, the farm manager, so that the water may be pumped as close to the irrigated

fields/

fields as possible. We must closely watch the water levels and make repeated determinations of the quality of the water so as to prevent a brackish water invasion into the fresh water on the north. This may involve drilling some wells for observation purposes only.

Respectfully yours,

Glen F. Brown, Chief
Natural Resources Division

Copy: R.A. Brankamp
George Wilson

Jidda, Saudi Arabia
July 31, 1952

H. E. the Finance Minister
Kingdom of Saudi Arabia
Jidda

Your Excellency:

I have the honor to present a preliminary report on a proposed dam and storage reservoir on Wadi Abha.

If agreeable with Your Excellency the U.S.G.S. - T.C.A. Mission will undertake to implement the recommendations contained therein soon after October 1, 1952.

Please accept my respects.

Donald F. Dougherty
Donald F. Dougherty

cc: Dr. Stratton ✓
Sadek bey Husseini

Preliminary Report on Proposed Storage Reservoir for Abha

It has been proposed to construct a dam on Wadi Abha approximately 1½ kilometers southwest of the town of Abha on or near the site of an older dam which has been partially washed out. This dam would store water for the use of residents of Abha and several villages further down the wadi.

The site was inspected by Dr. John Tothill and Mr. T. C. Smallwood of the FAO, U.N. Mission and Glen Brown of the U.S.G.S.-T.C.A. Mission on March 30, 1952. That inspection and a recent study of aerial photographs provided the following information:

Drainage area above proposed damsite - - - - - - - - - - - - - 14,900 acres

Area within basin under terraced cultivation (above damsite) - 4,500 acres

Surface area of proposed reservoir (spillway crest 15m high) - 116 acres

Storage capacity (to spillway elevation) - - - - - - - - - - - 1,800 acre-feet

On the basis of studies of vegetation, Dr. John Tothill made a tentative estimate of the average annual rainfall for this area as about 12 inches. The rain comes in thunderstorms mostly in late summer and is reported to produce as many as ten or twelve individual floods per year. Assuming 50% runoff for the uncultivated area and 10% runoff for the terraced area, the total amount of water available for use below the dam in an average year might reasonably be expected to be 5,400 acre-feet. It is obvious that a reservoir with the capacity given above (1,800 acre-feet) could not store the entire flow for a year, but since some of the water would be required during the rainy season for the durra crop the reservoir would be used to extend diversion during and following each flood and possibly to store excess water from the rainy season for use during the following dry season. For these purposes the available storage appears to be sufficient.

The type of structure which appears to be most suitable would be a rock-fill dam with impervious membrane. This could be built almost entirely with local labor and with materials available locally. Rock can be obtained in the immediate vicinity (possibly from the spillway excavation) and material for the impervious membrane can be obtained from deposits of laterite within about 80 kilometers of the damsite. Approximately 50,000 cubic yards of rock would be required for the dam. The quantity of material for the membrane and spillway will be determined by the nature of the design. The spillway might be placed in the saddle northwest of the damsite (see attached sketch, sheet 5). The granite at the damsite is suitable for a foundation.

Mr. Smallwood, in his Progress Report No. 4 to FAO states, "The project seems to be feasible enough to justify more detailed investigation". This office concurs with that opinion.

Recommendations:

(1) A detailed topographic survey should be made to confirm the storage available and to obtain additional data on which to base the design of the dam and spillway.

(2) Detailed geologic studies should be made to determine the suitability of foundations for spillway(s) and of material for the rock fill and the impervious blanket.

(3) A recording gage should be installed as soon as possible to obtain actual records of stream flow. This data will be needed for proper computation of available runoff and also for computation of required spillway capacity.

(4) Studies should also be made of the permeability of the rock comprising the walls of the canyon, particularly in that region on the south

side of the upper reaches of the reservoir where the edge of the Asir escarpment approaches very close to the stream channel (see sheet 5). It is suggested that this location on the Asir escarpment might also be considered for use as an alternate spillway, thus serving two purposes, (a) it would divert major floods out of the drainage basin, avoiding property damage in Abha and other towns in the valley, (b) it would tend to stabilize this section, eliminating the possibility that sometime in the future Wadi Abha might break through at this point and its entire flow be lost to the present valley. This latter possibility should be considered whether or not the propsed dam is built.

9-213-C
(March 1949)
Sketch Form

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File ____________

Wadi Abha, Drainage Area above Proposed Damsite

▨ Cultivated Area (terraces)

Information compiled from aerial photographs and Mosaic of Tihama-Asir Area produced by Aero-Service Corp., 1951

Scale 1:50,000

Sheet No. 4 of 5 Sheets. Prepared by DTD Date 21/7/52 Checked by ____________ Date ____________

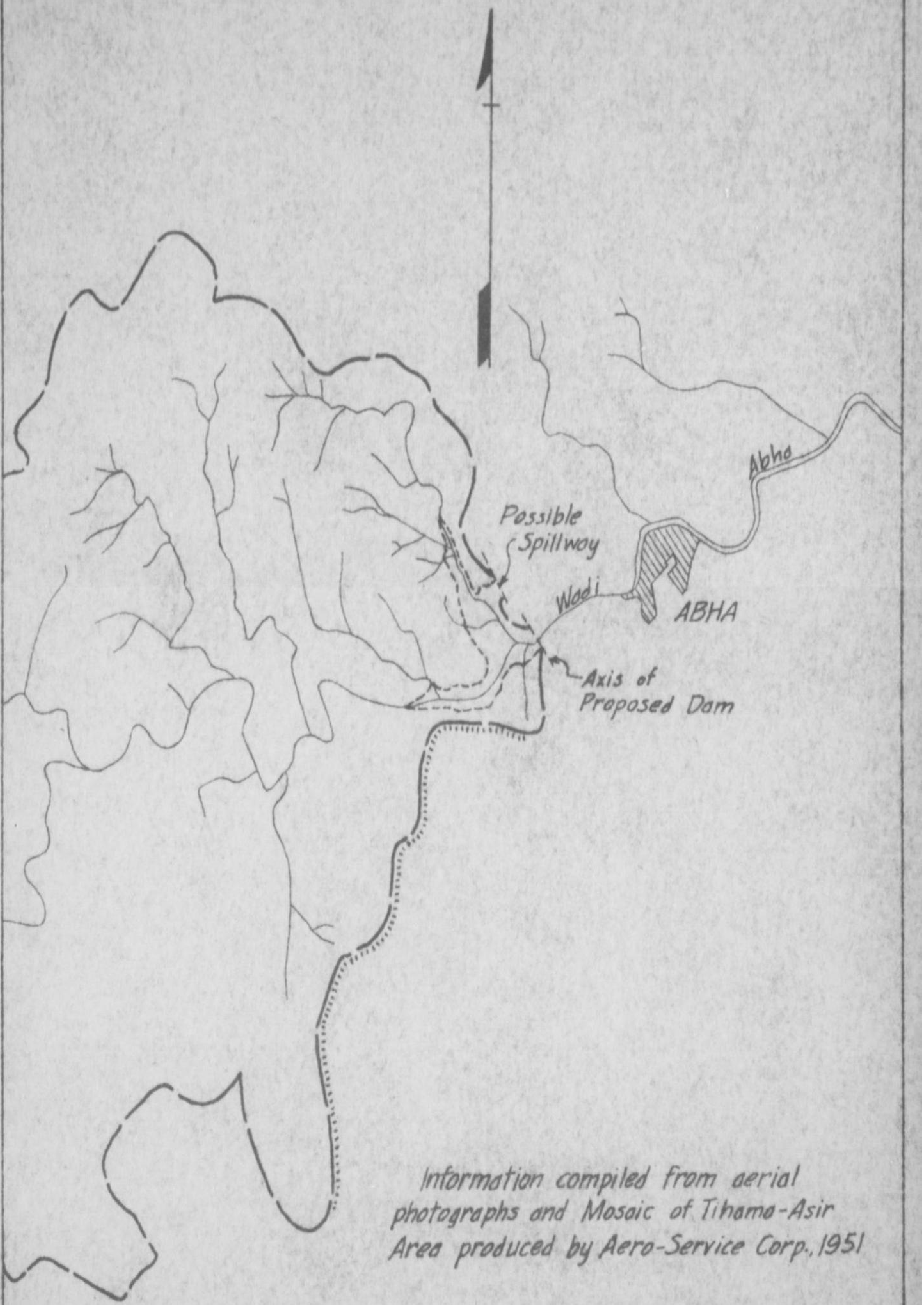
U. S. GOVERNMENT PRINTING OFFICE 16—25896-5

9-218-C
(March 1949)
Sketch Form

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File ....

Wadi Abha, Proposed Damsite and Reservoir Area



Information compiled from aerial photographs and Mosaic of Tihama-Asir Area produced by Aero-Service Corp., 1951

Scale 1:50,000

Sheet No. 5 of 5 Sheets. Prepared by D7D Date 20/7/52 Checked by .... Date ....

U. S. GOVERNMENT PRINTING OFFICE 16—68696-3

Jidda, Saudi Arabia

August 2, 1952.

MEMORANDUM TO: Sadek Bey Husseini, Director
Liaison Office, Technical Assistance

FROM: Office of U. S. Director of Technical
Cooperation in Saudi Arabia

RE: Letter to His Excellency, the Minister of Finance,
from Donald F. Dougherty, dated July 31, 1952.

The enclosed preliminary report on a proposed dam and storage reservoir on Wadi Abha from Donald F. Dougherty is being passed on to you for translation and transmittal to His Excellency, the Minister of Finance.

Edward Betzig
Assistant Program Officer

EB/1
Enclosure

Jidda, Saudi Arabia

July 27, 1952.

MEMORANDUM TO: Sadek Bey Husseini, Director
Liaison Office, Technical Assistance

FROM: Office of U. S. Director of Technical
Cooperation in Saudi Arabia

RE: Letter to His Excellency, the Minister of Finance,
from Dr. Glen Brown, dated July 27, 1952.

The enclosed report from Dr. Glen F. Brown is being passed on to you for translation and transmittal to His Excellency, the Minister of Finance.

Samuel S. Stratton
U. S. Director of Technical
Cooperation in Saudi Arabia

cc this memo to
Glen Brown

~~Washington~~
~~Folder~~

Jidda, Saudi Arabia
July 27, 1952

H. E. The Minister of Finance
Kingdom of Saudi Arabia
Riyadh.

Your Excellency:

In accordance with your desire, as conveyed by Mr. Locke, I wish to assure you that test drilling for the check dams at Riyadh is in the Baker drilling schedule, and that the diamond drills for testing the flanks of the sites and possibly the limestone beneath the gravel in the channel in Riyadh await disposal by Mr. Wilson. He will coordinate the drilling in connection with his study of the quantity of water available in the old channel of Hanifa, and Mr. Dougherty, U.S.G.S. hydraulic engineer, plans to visit Riyadh in a few days, with your permission, to examine the proposed sites, install a flood-stage recorder, and examine the Hayir confluence of wadis for estimation of flood sizes. The check dam should logically follow the completion of the Hayir hydrologic work and an estimation of the feasibility and efficiency of the check dams should be made by Mr. Wilson and Mr. Dougherty prior to the beginning of construction.

On July 20 I submitted a preliminary estimate of pipeline needed for the Yenbo, Umm Lej, and Wejh water supplies. This was done at the verbal request of H. E. Najib bey Salha, so that your government might place the necessary pipe order. It should not be construed as taking the place of an engineering survey which should now be done. Such a survey should include a spirit level survey of the pipeline route, design and purchase of pumping equipment, and design and construction of storage reservoirs as well as simple distribution systems.

The aerial surveys we plan this fall will facilitate such engineering design which engineers in your employ should do.

Your Excellency will be grateful to know that a substantial supply of fresh water has been found by a Baker drilling crew at a point 37.5 kilometers east of Qizan for the FAO agricultural project. A rotary rig to test the coastal plain between this site and the city is on order and will be delivered to Jidda next month. If water is not found closer to Qizan it will be necessary to extend a pipeline to this point.

As soon as aerial photographs are taken this fall for the area between Jidda and the Qizan basin, a survey for a road along the Tihama should be made. Proper location of this road can be very important for the future self-sufficiency of your country. The photography will include the narrow strip of terraced cultivation along the crest of the Asir so that a road along the crest connecting Taif to Abha and Nejran may be included in next year's plans, as well as a connecting road from the highlands to the Tihama, if your government wishes.

Please accept my respects.

Glen F. Brown
Glen F. Brown

cc: Dr. Stratton ✓
Mr. Vincent
Mr. Wilson

Natural Resou

File — Reports to S.A.

NATURAL RESOURCES To Min Fin. July 20, 1952.

Jidda, Saudi Arabia

July 20, 1952.

MEMORANDUM TO: Sadek Bey Husseini, Director
Liaison Office, Technical Assistance

FROM: Office of U. S. Director of Technical
Cooperation in Saudi Arabia

RE: Letter to His Excellency, the Minister of Finance
from Dr. Glen Brown, dated July 20, 1952.

The enclosed report from Dr. Glen F. Brown is being passed on to you for translation and transmittal to His Excellency, the Minister of Finance.

Samuel S. Stratton
U. S. Director of Technical
Cooperation in Saudi Arabia

cc this memo to
Glen Brown

1) ~~ED: Possibility for~~
~~ED monthly report~~ ?
2) File: Nat. Resources

Jidda, July 20, 1952

H. E. Minister of Finance
Kingdom of Saudi Arabia

Your Excellency:

In accordance with your request I have visited Wejh and vicinity, studying the geology in a reconnaissance fashion as well as measuring and sampling the wells.

The water for the town, now carried by camels and donkeys, comes from Bir Magrona 10 kilometers east of Wejh at the junction of two wadis which there form Wadi Gilha. Wadi Gilha is the wadi which reaches the sea at Wejh.

The geology between Wejh and Bir Magrona is such as to indicate little likelihood of fresh water by drilling at a point closer to Wejh than Bir Magrona. The water in Bir Magrona is of satisfactory quality whereas the best water in wells closer to Wejh analyses about five times as much salt.

Because of possible economic deposits in the vicinity of Wejh and because it appears that ground water may be developed at Ummlej, we plan to photograph the area this fall and map the geology. At that time geologic conditions may be seen warranting test drilling in the vicinity of Wejh.

In any event a pipeline will be necessary, both at Wejh and Umm Lej. The minimum pipe line at Umm Lej is 5.5 kilometers. In both places the line can be buried and therefore cement-asbestos pipe would be satisfactory and the five-inch size similar to that for Gizan would be adequate. Bir Magrona is 165 feet above Wejh according to my altimeter survey, indicating that water can be delivered to Wejh by gravity. The well is now equipped with a gasoline pump which can be used or later replaced. 10.5 kilometers of pipeline will be needed at Wejh.

As for the water supply for Yenbo, a minimum of 24 kilometers of pipeline will be needed and possibly as much as 31.5 kilometers. As a drilling rig will go there shortly to install and test a production well perhaps it would be wise to wait until the well has been thouroughly tested before ordering the pipe. We have been unable to do this because no casing is available. Some is now being shipped from Dhaharan. From an altimeter survey between the source and the town of Yenbo el Bahr, it appears that five inch cement-asbestos pipe, tested for a working pressure of at least 178 pounds, would be adequate. The location of the line is accross a gravel plain so it may be buried with a ditching machine except for a very short distance at the town which is on coral.

From the electric log and an inadequate bailer sample the water appears at least as good as Ain Mubarak the lowest ain in Yenbo el Nakhl and I feel confident that we can get the supply at the present source or seven kilometers upstream. (Hence the minimum figure of 24 kilometers and a possible maximum of 31.5 kilometers). The only mistake that may be made now would be ordering insufficint pipe.

I am returning to the United States to expedite aerial photography for the water and minerals survey but I may be reached through Dr. Stratton's office.

Please accept my respects.

Glen F. Brown

Glen F. Brown

Copy to Sadek by Houssein

Jidda, Saudi Arabia

May 25, 1952.

CONFIDENTIAL

OFFICIAL - INFORMAL

MEMORANDUM TO: Dr. Thomas A. Hart

FROM: Mr. Edward Betzig

RE: Natural Resources Field Party Proposed Water Well Drilling Program

The enclosure is a report to the Minister of Finance prepared by Glen Brown and George Wilson, Water Resources Engineer, Michael Baker, Jr., Inc., outlining the proposed water well drilling program.

It is an example of the practical results of the Natural Resources Mission's work and represents an important step forward in water exploitation and use.

Edward Betzig
Assistant Program Officer

Attach.

CONFIDENTIAL

NAT. RESOURCES
(X-COPY FILED "DR. HART-TO")
X - Reports to S.A.

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File

Jidda, Saudi Arabia

May 15, 1952

H.E. Minister of Finance
Kingdom of Saudi Arabia
Jidda

Your Excellency:

Herewith is a water resources program prepared by George Wilson, Water Resources Engineer with Michael Baker, Jr., Inc., and myself. It includes personnel, equipment and a drilling schedule in accordance with your wish that Baker take on the water-well drilling program. If you concur, would you kindly:

1. Approve a work order for Baker to design and begin construction by ordering the necessary material to build the drilling department warehouse, garage and compound.
2. Approve the recruitment as soon as possible of a mechanic and two drillers.
3. Approve the purchase orders so they may be placed in the hands of the Rochester purchasing office of Baker where the drilling superintendent and mechanic may assist them in filling the orders before coming to Arabia.

We are hopeful that the schedule for operating the rigs will be reviewed so that major alterations at a later time will not be made to handicap the execution of the program. The aerial mapping should precede test drilling in any locality; otherwise we are not using all the information needed to develop the limited supplies of the desert and may make serious mistakes. In the meantime I am pressing TCA for an early decision of the photography.

Please accept my respects.

(signed) Glen F. Brown
Glen F. Brown
Chief, U. S. Geological
Survey Mission to Saudi Arabia

Copy to
Dr. Stratton

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PROPOSED WATER WELL DRILLING PROGRAM

I. INTRODUCTION

The Saudi Arab Government has expressed its intention that its water well drilling operations be carried out by Michael Baker, Jr., Inc. (refer B. S. Fahoum memo to W. L. Anderson, dated May 4, 1952). The purpose of this report is to outline the work presently anticipated and to summarize the equipment and personnel requirements for carrying out the program. It is emphasized that since much of the work is of an exploratory nature it is impossible to make firm predictions or to place completely comprehensive orders. The program outlined is based on present information to serve as a guide. Any alterations, however, whether dictated by policy or expediency, will be brought to the attention of all concerned. The requisitions for personnel and material attached hereto have been prepared on the basis of fully equipping and manning the drilling rigs now on hand and on order, plus adequate pumps and pipe to implement small development projects in the next few months.

This program does not include a plan for maintenance and repair. With the installation of deep well turbine pumps in connection with development projects, it will be necessary to provide pump maintenance and repair service. This will logically come under Construction and Maintenance, and it is recommended that it be given early consideration, as the widely spread installations will present a considerable maintenance problem.

II. PROCEDURE AND PLANNING FOR A DRILLING SCHEDULE

The forward drilling program, as now planned, is shown in Table 1. The normal course of events for developing the water resources of any location are as follows:

COPY

a) Request of the Saudi Government to the U. S. Geological Survey Mission that a study of the region be made.

b) Geological reconnaissance by U. S. Geological Survey Mission.

c) Report of survey, with recommendation for test drilling if indicated.

d) Test drilling, test pumping, water analysis.

e) Analysis of all data and formal report prepared either by the Water Resources Engineer, or jointly by U. S. G. S. Mission and Water Resources Engineer or by U. S. G. S.

f) Development planning and engineering, if results are favorable.

g) Construction.

Most of the drilling scheduled for the next year will be exploratory, carried out in cooperation with the U. S. Geological Survey Mission to Saudi Arabia and for this reason the demand for pumps and casing will be appreciably less for that period. It is of the highest importance that this exploratory program be done as expeditiously as possible with development work held to a minimum until it is complete. Otherwise much water will be lost to the people of Saudi Arabia. It is of course, possible to drill a large number of unexplored and uncontrolled holes across the country, but it must be evident that the success of the water resources program should be measured by the amount of water made available, rather than by the number of wells or the footage of hole. One such well as can be developed in Shaib Ha' is worth more than a dozen dry holes or small producers.

III. PERSONNEL

There are at present three drillers operating for the Baker Co. in Arabia, with two more requisitioned. Since there are seven drilling rigs

on hand or on order, it is apparent that two more drillers should be requisitioned immediately. It is felt that there is no justification at present for requisitioning a diamond core drilling specialist, as projected activities involving this work are not extensive and one of the present drillers is a competent diamond core man.

The requisition for a drilling superintendent having been approved, recruiting will be started immediately. It is felt, however, that the salary specified - 800 dollars per month - will be inadequate to attract the type of man necessary to fill this position. It will undoubtedly be necessary to offer a higher rate, and this should be done immediately, rather than lose several months in a futile quest. Accordingly, it is suggested that the salary be left open, with a ceiling of 1000 dollars per month.

In view of the fact that it is intended to make the drilling operations self-sufficient, with separate compound and warehouse, it is recommended that an automotive mechanic be obtained from the United States. His responsibility would include supervising all automotive maintenance, assisting the drilling superintendent on rig maintenance and the ordering of automotive spare parts. When the section is completely equipped it will have twenty-nine vehicles, which would impose an impossible load on the existing facilities, making it necessary to employ another mechanic in any event. The drilling department, garage and warehouse should be staffed with Italian and Arab mechanics, welders, etc.

In addition to the usual helpers and laborers, each rig must be provi with a competent tindal who can speak reasonably good English, plus a cook-housekeeper. The drivers must be assigned to the drilling crew, rather than taken on loan from the motor pool, and must be used for additional duties when on location.

V. EQUIPMENT, SUPPLIES, and MATERIAL

The material listed on the attached requisition falls into four categories, which are considered separately.

a) Transportation. Required as follows:

Star 83: 1 - 5 ton 6x6 flat rack. For rig.
1 - Power Wagon for hauling camping equipment, gasoline, personnel.

Star 72 (each):
1 - 5 ton 6x6 flat rack. For rig, Tulaa flat bed with hose, plate, and rollers.
3 - 15 ton semi trailer 6x6 trucks for hauling casing, screen, gasoline, diesel (a total of 3 for 4 rigs)
1 - Power Wagon for hauling camping equipment, personnel and pulling trailer.
1 - Air conditioned trailer.

Sullivan 300:
1 - 15 ton 6x6 truck to pull rig.
1 - 15 ton 6x6 truck to haul drill pipe, gasoline, etc.
1 - Power Wagon
1 - Air conditioned trailer.

Joy 150: 1 - 15 ton 6x6 truck to haul drill pipe, gasoline, etc.
1 - Power Wagon
1 - Air conditioned trailer.

Water Resources Staff and Utility:
Riyadh: Two Power Wagons
Jidda: Three Power Wagons, one station wagon.

In addition, 5 tank trucks, two of 3000 gallon capacity for rotary rig, three of 2000 gallon capacity for churn rigs, will be required to haul water for rotary rig operations and for cable tool operations where the water table is deep and an adequate supply remote.

	Total required	On hand	To order
5 - ton 6x6 flat beds	5	0	5
10- 15 - ton semi trailer 6x6 trucks	6	0	6
Power Wagon	12	2	10
Tank trucks	5	1(3000 gal)	4(3 of 2000 gal. 1,3000 gal.)
Station Wagon	1	0	1
Air Conditioned trailers	7	0	7

The drilling rigs on hand or on order are considered to be sufficient for the present, provided that no extensive uncontrolled drilling program is added to the existing one. If developments of this nature arise, the entire drilling program, equipment orders, and cost estimates will have to

e revised accordingly.

b) **Housing:**

A separate compound with cyclone fence and one gate is needed for storing and maintaining rigs and supplies in Jidda. A combination warehouse and garage with air conditioned offices for the drilling superintendent and head mechanic should be constructed in the drilling department compound. The warehouses should be of sufficient size to store parts, including tires for trucks, drilling rigs, pumps, motors, well screens and camping equipment. The garage should be of sufficient size and equipped with sufficient tools to make all repairs on the rigs and trucks, to fabricate special drilling tools, to dress and built up worn bits, etc. The yard space should be sufficient to store rigs, trucks, drill stem, casing, fishing tools, etc.

c) Development material and equipment, general stock.

The deep well turbine pumps, pipe, and fittings listed on Requisition R-123-J are necessary to provided a working stock of general items necessary for development projects of a minor nature. The desirability of having a basic stock of this nature on hand has been most apparent during the current emergency water program in Riyadh. No provision for a stock of pipe of over 8 inch diameter or of pumps with a capacity of over 250 gpm has been made at this time, as it is felt that larger project should be handled individually. It may, of course, become necessary or desirable to alter this policy at a later date

d) Drilling tools, hand tools, and casing.

The drilling tools and hand tools have been ordered with a view to making each rig reasonably self-sufficient in the field. At the same time, every effort has been made to avoid unnecessary duplication of little-used items. The very complete listing of hand tools represe an excellent investment, since with these a competent driller can effect repairs on field expedients which would otherwise require a return to base camp.

Additional hand and machine tools will be required for the shop, and it is recommended that these be requisitioned by the drilling superintendent and the mechanic prior to their depature from the United States. The mechanic should also place orders for spare parts for all automotive equipment on order for the section.

e) Camping equipment and miscellaneous supplies.

Too much emphasis cannot be placed on the necessity for providing the drilling drews with adequate camping equipment. No competent driller will continue to operate in the field for any length of time under their present living conditions, and adequate provision for their health and comfort must be made as soon as possible. The cost of replacing drillers is large enough to justify keeping morale as high as possible.Even with all the comforts that might be supplied to a temporary camp the working conditions are still extremely difficult.

Kerosene refrigerators in particular should be expedited.The drillers will spend about 90% of their time in the field,and the provision of fresh food is a necessity.

Medical kits complete with instruction pamphlets are also urgently required. It is emphasized that an ordinary first aid kit is not adequate for a crew operating heavy equipment several hundred miles from medical attention. It is further recommended that as time permits each driller be instructed in first aid and the diagnosis and treatment of such probable ailments as malaria and dysentry.

Air conditioned all metal trailers for living quarters are now standard equipment for drillers in hot countries. Light metal trailers can be pulled with power wagons to drilling sites and will permit drilling operations under the extreme desert conditions anticipated.Without mobile air conditioned

quarters it will be impossible for us to carry on continuous operations.

Trans-receiver radios are necessary for day to day supervision and reporting on the drilling operations. These should be the same type and of the same frequency as the Geological Survey radios on order, the trans-receiver in the Geological Survey office to be available to the drilling superintendent and Mr. Wilson for conversations with drillers in the field. Radio communication is vital for most efficient use of the drilling crews, for ordering parts, repairs, reporting on geological conditions, timing of electric logging, emergencies, food supplies for drilling crews, and so on.

(signed) George Wilson	(signed) Glen F. Brown
George Wilson Water Resources Engineer Michael Baker Jr., Inc.	Glen F. Brown Chief, U. S. Geological Survey Mission to Saudi Arabia

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PERSONNEL

ADMINISTRATION

Chief Engineer, MBJI

John McCormack

Plans Engineer, MBJI

F. D. Garretson

OPERATIONS

Chief, U. S. G. S. Mission

Glen F. Brown

Water Resources Engineer

George Wilson

Drilling Superintendent

On order

Senior Mechanic

Approval for recruiting requested.

Drillers

1. Walter Wissinger
2. Frank Drake
3. Wayne Hanlon
4. On order
5. On order
6. Approval for recruiting requested.
7. Approval for recruiting requested.

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Table 1 - SCHEDULES OF WATER WELL DRILLING

JIDDA

Star 72 (No.1)	Star 72 (No.2)	Star 72 (No.3)	Star 72(No.4)	Sullivan 3000	Joy 150
Leave as soon as possible for drilling agricultural holes at ABu Arish, Sabya(or Joy 150)	Leave as soon as possible for Afif Taif Railroad wells	To Taif Wadi Tathlith Wadi Bisha Railroad wells	Wadi Fatima Wadi Habauna	Yenbo, then back to shop for alteration overhaul, mounting Rabigh Hadda esh Sham Usfan	Qizan for municipal supply Qunfida Lith Wejh Umlejj

RIYADH

Star 83

Completion of test holes at Hayyir
Wells at Al Kharj
Production wells at Hayyir
Anaiza - Buraida

Note: The type of rig and number of holes at Hali, Yuba, Qunfida, Lith, Rabigh, Wejh, Um Lejj, Anaiza, Buraida, should be determined after aerial photography and geologic mapping is accomplished. In the meantime we shall do the best we can.

This does not include wells scheduled at Riyadh and Al Kharj which are now being drilled by Aramco or by contractors under Aramco supervision. A separate schedule can be made for that work.

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Reports to S. A

Jidda, Saudi Arabia

May 15, 1952

H.E. Minister of Finance
Kingdom of Saudi Arabia
Jidda

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Copy to
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Air conditioned all metal trailers for living quarters are now standard equipment for drillers in hot countries. Light metal trailers can be pulled with power wagons to drilling sites and will permit drilling operations under the extreme desert conditions anticipated. Without mobile air conditioned

quarters it will be impossible for us to carry on continuous operations.

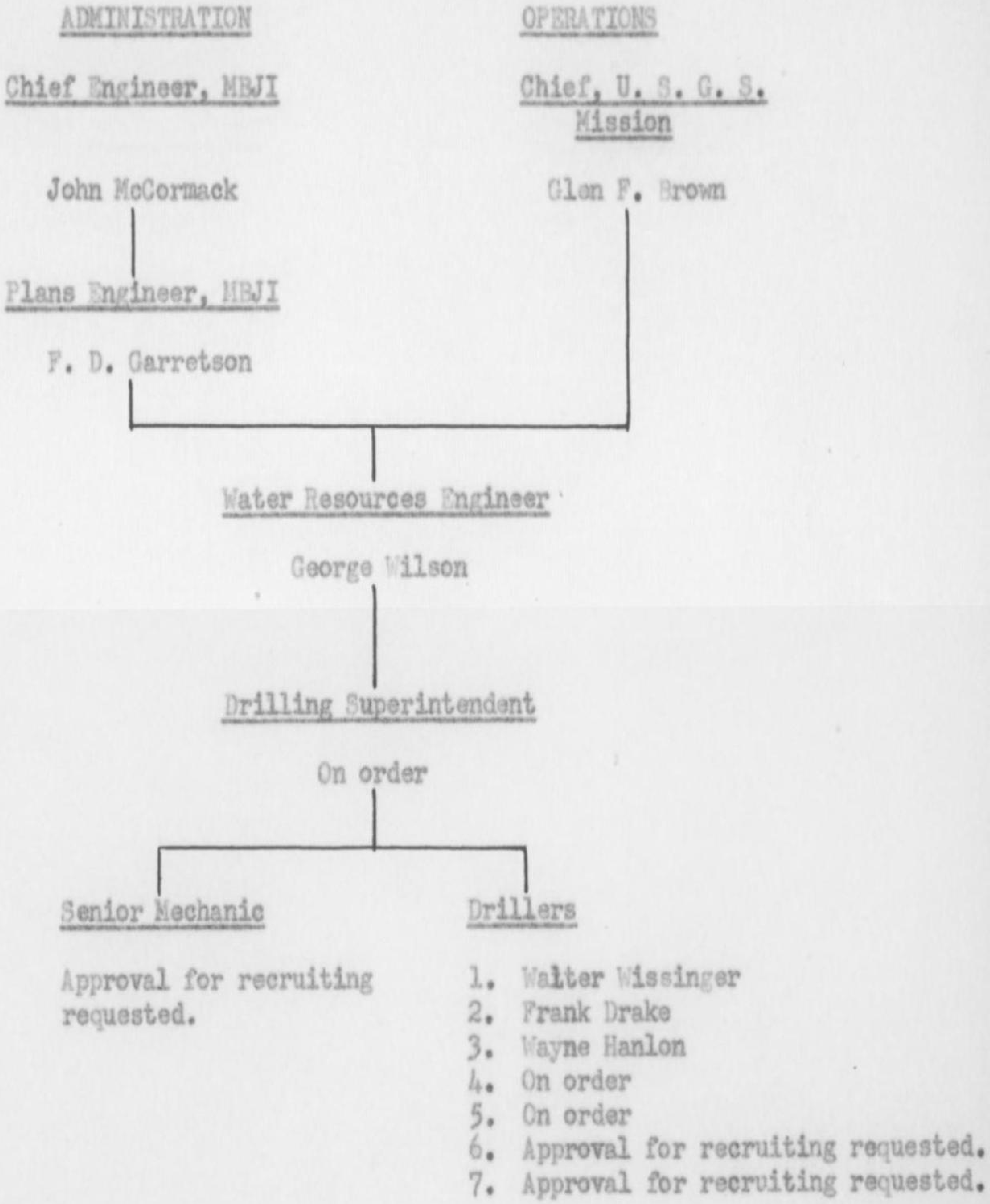
Trans-receiver/ radios are necessary for day to day supervision and reporting on the drilling operations. These should be the same type and of the same frequency as the Geological Survey radios on order, the trans-receiver in the Geological Survey office to be available to the drilling superintendent and Mr. Wilson for conversations with drillers in the field. Radio communication is vital for most efficient use of the drilling crews, for ordering parts, repairs, reporting on geological conditions, timing of electric logging, emergencies, food supplies for drilling crews, and so on.

George R Wilson — Glen F. Brown

George Wilson
Water Resources Engineer
Michael Baker Jr, Inc.,

Glen F. Brown
Chief, U. S. Geological Survey
Mission to Saudi Arabia

P E R S O N N E L



ADMINISTRATION

Chief Engineer, MBJI

John McCormack

Plans Engineer, MBJI

F. D. Garretson

OPERATIONS

Chief, U. S. G. S. Mission

Glen F. Brown

Water Resources Engineer

George Wilson

Drilling Superintendent

On order

Senior Mechanic

Approval for recruiting requested.

Drillers

1. Walter Wissinger
2. Frank Drake
3. Wayne Hanlon
4. On order
5. On order
6. Approval for recruiting requested.
7. Approval for recruiting requested.

Table 1 - SCHEDULES OF WATER WELL DRILLING

JIDDA

Star 72 (No. 1)	Star 72 (No. 2)	Star 72 (No. 3)	Star 72 (No. 4)	Sullivan 3000	Joy 150
Leave as soon as possible for drilling agricultural holes at Abu Arish, Sabya (or Joy 150)	Leave as soon as possible for Afif Taif Railroad wells	To Taif Wadi Tathlith Wadi Bisha Railroad wells	Wadi Fatima Wadi Habauna	Yenbo, then back to shop for alteration overhaul, mounting Rabigh Hadda esh Sham Usfan	Qizan for municipal supply Qunfida Lith Wejh Umlejj

RIYADH

Star 83

Completion of test holes at Hayyir
Wells at Al Kharj
Production wells at Hayyir
Anaiza - Buraida

Note: The type of rig and number of holes at Hali, Yuba, Qunfida, Lith, Rabigh, Wejh, Um Lejj, Anaiza, Buraida, should be determined after aerial photography and geologic mapping is accomplished. In the meantime we shall do the best we can.

This does not include wells scheduled at Riyadh and Al Kharj which are now being drilled by Aramco or by contractors under Aramco supervision. A separate schedule can be made for that work.

File
Natural
Resources

MICHAEL BAKER, JR. INC.
Engineers
Public Works Division
Riyadh, Saudi Arabia

EMERGENCY WATER SUPPLY FOR TEMPORARY INCREASE IN POPULATION OF RIYADH, AS A RESULT OF THE UNUSUALLY DRY CONDITIONS IN THE NEJD THIS YEAR.

RECOMMENDATIONS.

1. Drill a relief well at 22-B to increase the supply of water to the two hundred thousand (200,000) gallon reservoir on the southern edge of Riyadh. This well should be twelve (12) inches in diameter, and a pump larger than five (5) inches and smaller than twelve (12) inches in it. It is requested that a work order be issued for this job.

2. Increase the number of watering points in South and East Riyadh, derived from the two hundred thousand (200,000) gallon reservoir. This involves extending the water mains about six thousand (6,000) feet in accordance with work orders already issued to the Baker plumber through Mr. Schmitt.

3. Tap the line from well #13 and extend a temporary line for Bedouin encampments near the power house. This well supplies water to the power house and the airport, a requirement of about one-fourth (¼) the pumping time of the well. It is imperative that maintenance parts and stand-by equipment be kept on hand for this well at all times. A work order whould be issued for this phase of the project.

Signed

(G. F. Brown)
(F. D. Garrettson)
(G. R. Wilson)

MICHAEL BAKER, JR., INC.,
Engineers
Public Works Division
Riyadh, Saudi Arabia

MATERIAL AND EQUIPMENTS FOR EMERGENCY WATER SUPPLY.

1. Well 22-C.

   (a) Drilling Rig. HRH the Crown Prince has assured us that he will make available to us a rig within a few days. Following the completion of well 22-C, this rig will go to Hayyir to expedite exploratory drilling there.

   (b) Casing. The necessary twelve (12) inch casing is on hand.

   (c) Pump. Deep-well turbine with diesel drive. An eight (8) inch pump is desirable.

   (d) Pipe. Two hundred (200) to three hundred (300) feet of six (6) inch water line is on hand to tie the new well, 22-C, to the existing pipe-line.

2. Extension of Existing Water Line.

   (a) Where we may get the necessary pipe-line is still being studied and may have to await our trip to Dhahran.

   (b) Fittings. Sufficient fittings are on hand.

3. New Watering Point from Well 13.

   All necessary pipe and fittings are on hand. Thirty (30) sacks of cement may be required for the construction of a watering trough.

Signed

(G. F. Brown)
(F. D. Garrettson)
(G. R. Wilson)

MICHAEL BAKER, JR., INC.,
Engineers
Public Works Division
Riyadh, Saudi Arabia

HAYYIR PROJECT FOR ADDITIONAL WATER SUPPLY TO RIYADH IN SOME MONTHS TIME.

RECOMMENDATIONS.

1. We have just completed a pumping test on well #42, located one (1) kilometer below the junctions of water at Hayyir, thirty (30) kilometers south of Riyadh, which indicates that a minimum of one million (1,000,000) gallons a day may be drawn from the area and that considerably more may be available. The amount of additional water available depends on wells now being drilled and pumping tests to be made, as well as analyses to determine quality of water from the "wadis". The water from well #42 is potable, but will be analyzed for dissolved salts, in Dhahran and Jeddah.

2. Calculations on the pipe-line from Hayyir indicate that an eighteen (18) inch line may reasonably be installed. This will be adequate for flow rates up to three million (3,000,000) g.p.d., without imposing excessive pumping costs. It is emphasized that this is in no sense a guarantee that this quantity of water will be available from Hayyir. In the event that only one million (1,000,000) gallons a day can be proven, the line will be over-sized, which will be compensated for, to some extent, by reduced pumping costs. This is not the best engineering, but, in view of the urgent desire of the Saudi Arabian Government to expedite this project, it is our opinion that this is the best solution under the circumstances.

3. The final installation of wells, the pumping rates and operating schedules of the plant will be based on the results of the pumping tests and on a report based on a study by Mr. Wilson of the quantity and quality of all the water available from the various sources.

Signed

(G. F. Brown)
(F. D. Garrettson)
(G. R. Wilson)

File
E

File

Natural Resources
X-Ref: Aramco

Jidda, Saudi Arabia

April 26, 1952.

Dear Mr. Kidd:

I have read with interest the letter dated January 28, 1952, addressed to you by Mr. Donald M. Baker.

From the point of view of TCA, it would not seem advisable at this time to engage the services of an engineering firm for a study of ground-water resources. At the moment, in addition to Dr. Brown, we have two other geologists working in the field on the development of water resources.

In the few weeks which have elapsed since our very pleasant visit in Washington and New York, I feel as if I had become an old Saudi Arabian hand. Just yesterday I returned from Dhahran where I had a very interesting and worthwhile visit.

I found the Aramco officials quite helpful and cooperative, and I came away impressed not only with the achievements Aramco is making in this country, but with the pioneering work they have done and are still doing in what might be called the Point 4 area.

I want this note to be a belated expression of my sincere appreciation for your many kindnesses before I left for Saudi Arabia.

With best wishes to you,

Sincerely yours,

Samuel S. Stratton
U. S. Director of Technical
Cooperation in Saudi Arabia

Mr. Philip C. Kidd,
Arabian American Oil Company,
505 Park Avenue,
New York 22, New York

bc: Dr. Thomas A. Hart, TCA, Wash.

ARABIAN AMERICAN OIL COMPANY
A CORPORATION
505 PARK AVENUE
NEW YORK 22, NEW YORK

March 31, 1952

Dr. Samuel S. Stratton
c/o American Embassy
Jeddah, Saudi Arabia

Dear Dr. Stratton:

Before your departure for the Middle East I mentioned a proposal of a consulting engineer in California concerning studies of the ground-water resources of Saudi Arabia. I promised to furnish you a copy of this proposal.

I now enclose two copies of a letter dated January 28, 1952 from Mr. Donald M. Baker of Ruscardon Engineers, 448 South Hill Street, Los Angeles 13, California.

I was delighted to hear from Bill Eddy in Beirut that he and Mary had seen you and Mrs. Stratton during your stopover there. I hope that you are finding life agreeable in the "finest city on the eastern shore of the Red Sea".

Cordially,

Phil Kidd

PHILIP C. KIDD

PCK:JD
Encls. (2)

C
O
P
Y

RUSCARDON ENGINEERS
Engineering - Management
448 South Hill Street
Los Angeles 13, California

January 28, 1952

Mr. Philip C. Kidd
Arabian American Oil Company
505 Park Avenue
New York 22, New York

Dear Mr. Kidd:

I have yours of January 8th last, and thank you for your interest in my letter of November 16, 1952 pertaining to the possibility of studies relative to the ground-water resources of Saudi Arabia, and also for your willingness to have me write to Dr. Glenn S. Brown of the U. S. Geological Survey.

I agree with you from what you say in your letter that now is probably an inopportune time to suggest to the Government that they obtain the services of other consultants on this matter.

As to writing Mr. Brown, during the 1930's I was a member of one of the various advisory panels set up under the Water Resources Committee of the National Resources Planning Board. Our panel was composed of a fine group of engineers, from both Federal agencies and from engineers in private practice. Most of us, including myself, were Republicans.

We did some very interesting work, but never seemed to get anywheres with it. There always seemed to be that some bright young chap who, although knowing little or nothing about the subject, arranged to have our reports and recommendations pigeonholed. None of us could ever get over his head to discuss things with an older and more mature official near the top. As a result I have never been very enthusiastic about these Federal projects nor over employment in connection therewith. Things, however, may be somewhat different at the present time.

With my scant knowledge of Saudi Arabia it is somewhat difficult to outline a program of what service I could render over there. I secured a copy of Mr. K. S. Twitchell's small book on Saudi Arabia, apparently written after his service as a member of the U. S. Agricultural Mission to that country in 1943. I also found an article by him in the July 1944 issue of the Geographical Review on "Water Resources of **Arabia**", which appeared to be a summary of the findings in the above Commission in relation to water supply. In the July 1951 issue of the Geographical

Review there is some material concerning agricultural developments in Saudi Arabia.

Reading through this material, however, it struck me that efforts up to now have been primarily pointed to projects - what could or should be done in this or that locality where a water supply is known to exist. Apparently from the last above article, several small projects have been initiated.

Nowhere, however, did I encounter what I would consider a comprehensive approach to the problem, and it was on this phase that my interest was centered. There seems to be an almost complete lack of basic hydrologic data, which is of course the backbone of any comprehensive plan for water development of any area.

Apparently a large portion of the country has a very low precipitation - whether it is sufficient to sustain range feed or not is not apparent. If such range does exist, it could be developed only if stock water is available.

Before World War I, I spent several years with the U. S. Indian Irrigation Service in northern Arizona, and we opened up large areas of good range land by developing water through installation of windmills. I recall receiving a bulletin or a report - it is somewhere in my files now - a few years ago concerning recent developments in windmills, and as I recall it these were very surprising to me from the standpoint of the progress which has been made.

Several references were made in the above literature concerning large dry washes in which occasionally heavy flood flows occurred. This would indicate replenishment to some areas in which substantial ground-water development might be possible. Mention was also made of possible surface storage sites which would warrant investigation. In my experience in the deserts of northern Arizona, New Mexico and Nevada, the flash floods which occur there usually have a very high silt content which would undoubtedly make surface storage infeasible. Where the water can be placed underground and where producing wells can be developed, however, these flashy streams do frequently provide substantial replenishment to ground-water reservoirs. There is apparently very good replenishment to ground-water in some of the smaller stream Valleys running into the Red Sea, and there must be substantial replenishment around the Dhahran area where those large submarine springs are found offshore along the coast.

I realize that any substantial development in irrigated agriculture would entail marked changes in living habits, attitudes, customs and other characteristics of the native population, and it may be that these latter are not as yet ready for such changes, and that the advisable thing would be to start with some of the smaller irrigation projects, allowing nature, economics and similar matters to take their course.

Furthermore, if irrigated agriculture is to be based upon utilization of ground-water, this would call for power for pumping, which in turn would call for the availability of considerable quantities of fuel - gasoline or deisel. This is something on which I have no information. It may require time to make fuel available to interior locations.

Even if these latter things be true, however, later and larger developments, if they are to be considered as an objective, must be based upon adequate factual information concerning hydrology,

Such information is not secured in a matter of a year or so. Time is a vital element. A five-year precipitation record is usually worthless, unless there are adjacent records available for use in extending it. A few measurements of depth to water in wells or pits are likewise of little value when one is interested in the replenishment of a large ground-water basin or reservoir.

It seems to me, out of the depth of my ignorance of the country, that if there appears to be a future possibility of developing irrigated agriculture upon any kind of extensive basis, a start should soon be made in securing the basic information upon which such development must rest. The start could be made with the smaller projects, where a known water supply appears, extending the factfinding program to areas that appear to be promising from the standpoint of development within the next ten or so years.

This future development would naturally require trained people, who should ultimately, as far as possible, be natives. At the outset, foreign technicians would be needed. In the early stages when the Reclamation Bureau in this country was just starting, the technical personnel came almost entirely from men who had been with the U. S. Geological Survey or other Federal agencies and had been engaged in the type of investigational work which I imagine would be required in Saudi Arabia, before going with the Reclamation Bureau.

I do not know whether there are any native Arabian engineering graduates who might be sent to this country for graduate study in ground-water hydrology. If there were, it would be most fortunate, as these men could have two years over here, and return to form the nucleus of a native technical organization, which with subsequent students who follow them, could ultimately take over the development of the country.

It seems to me that this latter program should be started as soon as possible. As far as I know the University of California at Berkeley is the only school in the arid section of this country giving a suitable course in ground-water hydrology. Such course has only been started during the past year, when T. R. Simpson, who had spent some thirty years with the State Division of Water Resources here in California, left and took over a position which Professor B. A. Etcheverry, for years Professor of Irrigation, had held. Simpson has had extensive ground-water work, and is giving an excellent course.

My interest in doing some work over there was generated as a result of the trip which I took last summer to Europe. While in Brussels, as I stated in my former letter, I met a large number of engineers from arid sections of the World, Australia, India, and the Arid Countries in North Africa, which touch on the Mediterranean.

From these contacts I was impressed with the fact that in those areas ground-water development is about at the stage where it was in Southern California just following the turn of the century. We were lucky here in that a substantial amount of investigational work had been carried on just before development started. This gave us a sound basis upon which to proceed. At present of course, ground-water development here is more intense than in any place in the World.

We in our practice operate a purely consulting office, rendering personal service, and do not employ a staff. When the latter is necessary we develop it for our clients and supervise its operations. I am quite busy in my practice, but found, as a result of my trip to Europe last Fall, that I could get away for six weeks or so at a time, possibly twice a year, and it was this type of engagement in which I was interested. I don't think that I could give more than such an amount of time per year, away from the office, although of course I would have time available between trips, in the office.

What I had in mind, and I may be entirely out of line on this - not knowing conditions over there - was to make an initial trip to Saudi Arabia, covering a period of six weeks or so, size up the problem there, get the "feel" of things, and on my return develop a relatively small group - four to six at the outset - of technicians, men with ground-water background in this arid section of the country, who would go over there and make a start. It would take some time to secure such an organization and get them properly oriented towards the work.

I had in mind a second trip after this group had made a start, to see that they had started right, to find out the difficulties which they were encountering, etc., etc. This would be followed by possibly one or two trips per year to keep in touch with things, look into new developments or problems. Between trips I would expect to be advised by mail of developing results, and would make studies, etc., when sufficient data had accumulated to do so. It doesn't take very long for airmail to reach Saudi Arabia from Los Angeles at the present time.

I have the feeling that with several good men on the ground, forming the nucleus of an organization that could later be expanded, possibly by utilizing native Arabians who had had some graduate schooling in this country, it should be possible to develop an organization that within a period of say ten years, could really proceed with development.

I believe that a setup such as I have suggested would operate satisfactorily. I have done that in other cases, supervising the work from a distance and making infrequent visits to the scene of action. I don't believe that such a project would entail a large sum of money over the next ten years or so, and the value of the results secured would be inestimable.

If at some future time your Company feels that it would be interested in such a type of project I would be glad to hear from you.

Again thanking you, and with kind regards, I am

Very truly yours,

o/s Donald M. Baker
Donald M. Baker

DMB:el
cc: John R.Suman
airmail

PROGRAM
PROJECTS
NATURAL RESOURCES

Ltr to Dr. Hart, 4-22-52
re Brown's work

PROGRAM - Projects
NATURAL RESOURCES FIELD GROUP

Concerning the Brown group, Brown and Jackson are currently working on the wells of the Riyadh water project. Dr. Brown was here briefly coming from Yenbo and leaving almost immediately for Riyadh with Mr. Husseinni. He would seem to be most dedicated to this work, and as a result of his many years in this area to have a great feeling for the problem of the Bedouin.

In many areas, there has been a serious drought for the last two or three years forcing the Bedouin to leave the desert areas and to seek relief at the oases and cities like Riyadh. Frequently, their condition is pitiful. When it showered recently in Riyadh, their joy was so great that they wept as they prayed and gave thanks. Certainly this work of water survey and water use is of extreme value to the country, and everything that we can do to develop careful and scientific use of water resources will be contributing to the long-run progress and well-being of the people of Arabia.

I hope in the near future to be able to write you a detailed description of Brown's work.

. . . .

(See separate page for continuation this letter,
GENERAL - ADMINISTRATION)

RESTRICTED

Reports to S.A.
X natural Resourc

March 3, 1849

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
Jidda, Saudi Arabia

January 15, 1952

H.E. Sheikh Abdullah Suleiman
Minister of Finance
Kingdom of Saudi Arabia
Jidda.

Your Excellency:

The American Geological Mission has completed the field work for the basic planning in the Asir al Tihama and adequate base maps are now being prepared in Philadelphia. We plan to travel tomorrow to the Asir, where we hope to do the field work on 15,729 square miles, completing the block Asir-Tihama during this year. This may take as little as two, or, according to Said Ahmad Obeid, as much as 5 months work in the mountains. In the meantime, a test drill, which I had understood was on order from last spring, will, I hope, come and our driller can procede to the Asir al Tihama to test drill the coastal plain. The first holes to be drilled will be those for the city of Qizan supply as outlined in my report to you in October 16, 1951.

Thus I hope that by the time we have completed the field work on the Asir that the subsurface information for the Tihama will have been obtained and we can prepare a comprehensive report. Perhaps as much as a year may be needed before we have sufficient data to complete our reports in that area.

In the meantime we have made reconnaissance studies of the water supply situations at Yenbo, Rabigh, Jidda (where a test-drilling program is being initiated ahead of the Qizan study and including the test at Yenbo), and at the mining property of Dhalm or Jifan Oraimba. I believe that we have found sufficient water for Riyadh and the program there needs only construction of the check dams, completion of the testing at Ha'ir, and the installation of the Hai'r Pipeline. The Water Resources Specialist coming to Arabia for Baker Co. should be able to handle this development.

The hydraulic engineer being sent by the United States Geological Survey, will also need several months study in order to evaluate the quantity and duration of surface waters in both the Asir-Tihama and Taif areas.

The study of water development at Taif with special reference to Hawiya involves first the preparation of adequate topographic maps. Fortunately the topography prepared for Bechtel furnishes part of the necessary data and the remainder of the area is being mapped in the same manner as that used for the location of the Taif-Mecca road plus additional work on geology for water supply purposes. We have finished the field work except possibly some checking on results and including the study of various old dams in the vicinity, and today the aerial photographs are being sent to the contractor, Aero-Serice Corporation, for preparation of the base maps. As soon as these are completed we shall prepare and submit a report to you. In the meantime I hope that one of the churn drills, which I am told is now on order and will be shipped within 30 days, can be sent to drill two gravel deposits in the Taif area. Information from the drilling will be included in our Taif report.

The establishment of experimental farms, irrigation and reclamation works, roads, mines and so on must follow our preliminary studies which I am hopeful will now go ahead without interruption, that map compilation will follow rapidly on the heels of our reconnaissance field work, and that the reports can be prepared rapidly after the base maps are at hand.

Please accept my respects.

Glen F. Brown
Chief, U. S. Geological Survey
Mission to Saudi Arabia.

Blind copy
to Mr. Hare -

Rec'd 2/27/52

~~[illegible]~~
Mr. Crawford
[illegible]

Dr. Stratton:
This goes back to the Embassy (Crawford).
You may wish to take copies.
Amy

Amy
Amy
Dr. Stratton

Thursday, January 10, 1952

The following items were discussed between H.E. Minister of Finance and Dr. Glen Brown in the presence of H.E. Najib bey Salha, Sheikh Mohamad Surrour, Sheikh Hamad Suleiman and myself.

The Minister of Finance requested a report about the work already covered by the U.S. Geological Survey Mission so that if asked by Riyadh or the representatives of the United Nations about the work he would have something concrete to base his argument on. Dr. Brown asked the Minister for some time before submitting a report because his work is not yet completed. Only the area of Tihama has been covered in the last field season and in a few days the Mission is proceeding to the Asir area where the main work is to map the country and send the results with aerial photographs to Washington for the final map. After the final map is received then all the data would be completed - corrections, altitudes, the exact position of a definite place etc. Then a report would be drafted and presented to SAG giving in detail the groundwater situation and a study of the geology as well as a test drilling program for increasing the water supply. The Minister agreed to give Dr. Brown all the time required to finish the work and asked for a letter stating all the above facts. Furthermore, the United States Embassy should be kept informed of the work accomplished by the Mission.

The Minister then suggested that the people of Saudi Arabia, the nomads in particular, be induced to settle down in the areas where a possible future could be developed out of the land because of the presence of water and the fertility of the soil. The people are ignorant and would be unable to read reports and unless they can see, to learn, the new methods of agriculture and the use of modern equipment, they cannot be induced to settle down and try to develop the land. Specialists should be sent to the different parts of the country whereby they can explain the use of the equipment furnished either by SAG, the U.S. Government or the United Nations. Saudis from High School should be sent either to the American University of Beirut or to the United States to study and specialize in Agriculture, Geology, Agronomy and the raising of poultry and livestock to help the native population and replace the foreign missions.

Dr. Brown informed the Minister that a drilling rig operated by Mr. Frank Drake is to start putting in test holes in Wadi Fatima, Hada Sham, Wadi Kulais and Usfan. The Minister requested that the rig be sent to Yenbo as soon as Mr. Drake is through in Wadi Fatima. As soon as the drilling rigs, oredered by SAG, arrive they are to be sent to the Qizan area to put in test holes.

Kamal S. Najjar
Kamal S. Najjar